Exhibit 4

United States District Court

Southern District of New York

IN RE GLOBAL BROKERAGE, INC. f/k/a FXCM INC. SECURITIES LITIGATION	:	Case No. 1:17-cv-00916-RA-BCM

EXPERT REPORT OF TERRENCE HENDERSHOTT, PH.D.

June 10, 2021

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I. Qualifications

1. I am a Professor and the Willis H. Booth Chair in Banking and Finance at the Haas School of Business at the University of California Berkeley. **Appendix A** contains my CV and a list of my deposition and trial testimony over the last four years.

2. My expertise and research focuses on market microstructure, which includes how information is incorporated into security prices and the interaction between trading and prices of various securities and financial instruments. Specifically, I have conducted research regarding how the prices of stocks, corporate bonds, and other over-the-counter and exchange-traded products incorporate information. In addition, I have studied high-frequency trading, electronic communications networks and exchange design, regulation of financial markets, management of information systems, and the role of information technology in financial markets. My research has also been on market efficiency and related topics, including market liquidity and how market prices discover and incorporate new information. In addition, I teach graduate courses on topics including market making, trading, and foreign exchange markets.

3. I have published numerous articles on the structure, design, and regulation of financial markets and how market participants—such as market makers, high-frequency traders, and institutional investors—affect price discovery and the liquidity of different financial markets in leading economics and finance journals, including the *Journal of Finance*, *Journal of Financial Economics*, *Review of Financial Studies*, and *Review of Economic Studies*. Additionally, I received the New York Stock Exchange Euronext Award from the Western Finance Association and the Nasdaq Award from the Financial Management Association for my research on equity trading and market microstructure.

4. I teach undergraduate- and graduate-level courses on business analytics, information technology strategy, and high-frequency finance at the Haas School of Business. I have served on the editorial boards of leading operations management and finance journals, including *Management Science*, *Journal of Financial Markets*, and *Decision Support Systems*.

5. In addition to my academic work, I served as the visiting economist at the New York Stock Exchange from 2005 to 2006, as a member of the Nasdaq Economic Advisory Board from 2004 to 2007, and as chair of the Nasdaq Economic Advisory Board in 2007. I served

as a member of the Commodity Futures Trading Commission's ("CFTC") subcommittee of the Technology Advisory Committee ("TAC") focusing on High-Frequency Trading and the Financial Industry Regulatory Authority's ("FINRA") market surveillance advisory group. I have also consulted on issues related to market efficiency for a number of financial markets, high-frequency trading firms, and investment firms.

6. I am being compensated for my time and services on an hourly basis at my regular rate of $1,175 per hour. I was assisted in this matter by staff of Cornerstone Research, who worked under my direction. I receive compensation from Cornerstone Research based on its collected staff billings for its support of me in this matter. Neither my compensation in this matter, nor my compensation from Cornerstone Research, is in any way contingent or based on the content of my opinions or the outcome of this or any other matter.

II. Assignment

7. I was previously asked by counsel for Global Brokerage, Inc. f/k/a FXCM Inc. ("FXCM" or the "Company"), Dror Niv, and William Ahdout (collectively with FXCM, the "Defendants") to evaluate Dr. Werner's analysis and opinions contained in his Corrected Opening Report on Market Efficiency, dated January 10, 2020 ("Werner Market Efficiency Report"). In my expert report dated June 12, 2020 ("Hendershott Market Efficiency Report"), I opined that the Werner Market Efficiency Report did not provide reliable evidence to demonstrate that the FXCM 2.25% Convertible Senior Notes due 2018 (the "FXCM Notes") traded in an efficient market between June 24, 2014 and February 6, 2017 (the "Notes Period"). I found that Dr. Werner's market efficiency analysis for the FXCM Notes market in the Werner Market Efficiency Report suffered from serious conceptual and methodological flaws and deficiencies that rendered his opinion unreliable.

8. I was also asked to evaluate in the Hendershott Market Efficiency Report whether the purported damages methodology described in the Werner Market Efficiency Report could be used to calculate damages in this matter for both FXCM's common stock and the FXCM Notes in a manner consistent with Plaintiffs' theory of liability. I opined that Dr. Werner had failed to show in the Werner Market Efficiency Report that the generic damages approach he described, including his reference to an event study and a back-casting approach, could be used to reliably calculate damages in a manner consistent with Plaintiffs' theory of liability. The arguments raised in Dr. Werner's Rebuttal Report on Market Efficiency dated July 27,

2020 (the "Werner Market Efficiency Rebuttal Report") did not alter any of my opinions in the Hendershott Market Efficiency Report.

9. I understand that, following an evidentiary hearing on October 15, 2020, Magistrate Judge Moses issued a Report and Recommendation, dated March 18, 2021 (the "Report and Recommendation"), concerning Plaintiffs' motion for class certification, and that the Report and Recommendation recommended that Plaintiffs' motion be denied as to the FXCM Notes. I further understand that Judge Abrams issued an order adopting the Report and Recommendation on March 23, 2021.[1]

10. I have been retained by counsel for Defendants to review Dr. Werner's Report on Loss Causation and Damages, dated April 21, 2021 (the "Werner Loss Causation Report") and to assess the opinions and analysis therein pertaining to loss causation and damages. Specifically, I have been asked to evaluate (1) whether Dr. Werner's analysis reliably demonstrates that Plaintiffs and the Class members suffered losses caused by Defendants' alleged misrepresentations and omissions, and (2) whether Dr. Werner has reliably quantified any damages due to Defendants' alleged misrepresentations and omissions. A list of the documents and data I have considered in forming my opinions is attached hereto as **Appendix B**.

III. Summary of Allegations

11. Plaintiffs' allegations in this case focus on FXCM's public statements about its "No Dealing Desk" ("NDD"), or agency model, as well as its business relationship and agreements with a high-frequency trading firm, Effex Capital, LLC ("Effex") during the Class Period (*i.e.*, March 15, 2012 to February 6, 2017).[2] Specifically, Plaintiffs allege that "[f]or years, FXCM claimed that the Company's [NDD] platform provided its customers with

[1] Report and Recommendation to the Honorable Ronnie Abrams, *In Re Global Brokerage Inc., f/k/a FXCM Inc. Securities Litigation*, March 18, 2021 ("Report and Recommendation"); Order Adopting Report & Recommendation, *In Re Global Brokerage Inc., f/k/a FXCM Inc. Securities Litigation*, March 23, 2021.

[2] Plaintiffs define the Class Period as March 15, 2012 to February 6, 2017, both dates inclusive. *See*, Plaintiffs' Third Amended Consolidated Securities Class Action Complaint, *In re Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*, April 17, 2020 ("Complaint"), ¶ 1.

retail foreign exchange ('forex') trading that was free of conflicts of interest."[3] Plaintiffs further allege that Effex operated "as a functional subsidiary" of FXCM, and that FXCM entered into a "services agreement," whereby it gave Effex distinct trading advantages over other market makers, but retained 70 percent of Effex's trading profits (*i.e.*, nearly $80 million through 2014) disguised as "order flow" payments, all while continuing to make misstatements describing the NDD/agency platform as being conflict-free.[4] Plaintiffs allege that:

> Eventually, both the U.S. Commodity Futures Trading Commission ('CFTC') and National Futures Association ('NFA') brought regulatory actions against FXCM based on the Company's undisclosed relationship with Effex…. On February 6, 2017, the CFTC announced that it had banned the Company from operating in the U.S… The same day, the NFA also issued an order against FXCM…. and issued an order terminating the NFA memberships of FXCM and the individual defendants… In response to the CFTC and NFA orders, the price of FXCM's stock and the FXCM Notes dropped sharply, damaging investors.[5]

12. In addition, Plaintiffs claim that:

> FXCM's financial statements violated SEC regulations and Generally Accepted Accounting Principles ('GAAP') for failing to disclose FXCM's economic interest in, contractual and related party relationship with, and control over, Effex during the Class Period. Given that FXCM was entitled to 70% of Effex's profits, FXCM was required to (but did not) consolidate Effex's operations as a variable interest entity. Alternatively, even if Effex were not required to be consolidated, it was still a related party to FXCM and therefore, FXCM was required to (but did not) disclose the related party nature of the business relationship and the amount of profits FXCM was earning from Effex.[6]

IV. Summary of Opinions

13. Below I provide a summary of my opinions, the basis for which—including detailed explanations of my analyses, reasoning, and support—is outlined in the sections below.

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[3] Memorandum of Law in Support of Amended Motion for Class Certification and Appointment of Class Representatives and Class Counsel, *In re Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*, April 9, 2020 ("Plaintiffs Motion for Class Certification"), p. 3.
[4] Plaintiffs Motion for Class Certification, p. 4; Complaint, ¶ 11.
[5] Plaintiffs Motion for Class Certification, pp. 4–5.
[6] Complaint, ¶ 13.

14. Based on my analysis, I have found that Dr. Werner fails to reliably demonstrate that Plaintiffs and the Class members[7] suffered losses caused by the alleged misrepresentations and omissions. Dr. Werner's loss causation analysis suffers from various flaws and deficiencies, which render his opinion unreliable. Specifically,

a. Dr. Werner's event study analysis based on the residual security price declines following the February 7, 2017 alleged corrective disclosure fails to disentangle the impact of the allegedly corrective information regarding FXCM's agency model, or "no dealing desk," from regulatory and other collateral consequences revealed contemporaneously.[8]

b. From the perspective of an economist, these "collateral consequences" do not necessarily represent removal of inflation. Dr. Werner asserts, but has not demonstrated, that the regulatory consequences were "inextricable" or "foreseeable." He has not shown that had FXCM made an earlier disclosure about its business relationship and agreement with Effex, the market would have expected the same (or any) regulatory consequences as those which were revealed on February 7, 2017 to occur.

c. In addition, Dr. Werner has not established that the allegedly corrective information, absent the collateral consequences, was value relevant and caused any losses to investors. Dr. Werner has not shown any reliable evidence that a disclosure in February 2017 about FXCM's historical order flow relationship with Effex—a relationship that ended more than two years earlier in August 2014—would have had future cash flow implications for FXCM.

d. Nor has Dr. Werner demonstrated that a hypothetical earlier disclosure regarding FXCM's business relationship with Effex, or its agency model would have constituted negative information to investors. Similarly, he has failed to demonstrate that FXCM consolidating Effex as a Variable Interest

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[7] "All persons and/or entities that purchased or otherwise acquired publicly traded Global Brokerage, Inc., f/k/a FXCM Inc. ("FXCM") Class A common stock, during the period March 15, 2012 through February 6, 2017, both dates inclusive." *See*, Order Adopting Report & Recommendation, *In Re Global Brokerage Inc., f/k/a FXCM Inc. Securities Litigation*, March 23, 2021.

[8] The alleged corrective disclosure occurred after market hours on February 6, 2017. I therefore refer to February 7, 2017 as the alleged corrective disclosure date throughout this report. *See,* Order Instituting Proceedings Pursuant to Sections 6(c) and 6(d) of the Commodity Exchange Act, Making Findings, and Imposing Remedial Sanctions, *In the Matter of Forex Capital Markets, LLC, FXCM Holdings, LLC, Dror Niv, and William Ahdout*, February 6, 2017 ("CFTC Order").

Entity ("VIE") or making a related party disclosure during the Class Period would have had negative value implications for FXCM's investors.

15. Dr. Werner's damages calculation involves a "constant dollar" approach where he simply assumes that the price of FXCM's common stock and the FXCM Notes were inflated by a constant amount based on the residual price decline on February 7, 2017. Besides the flaws I have described regarding his loss causation analysis above, I conclude that Dr. Werner fails to reliably quantify damages attributable to the allegations for the additional reasons below. Specifically,

a. Dr. Werner's use of "constant dollar" inflation effectively assumes that what FXCM should have disclosed to correct the alleged misrepresentations and omissions did not change over time, nor did the value implications of such a disclosure change, but instead mirrored what actually was disclosed on February 7, 2017. Dr. Werner provides no reliable basis for such assumptions, which are inconsistent with the facts and evidence in this case as I understand them.

b. Dr. Werner has conducted no analysis to support Plaintiffs' contention (according to him) that "whatever information was disclosed on February 7, 2017," including the regulatory action and ultimate settlement outcome, "could have been disclosed at the beginning of the class period."[9] In fact, I understand that Plaintiffs have not demonstrated that FXCM was aware of the CFTC investigation until October 2014—two years after the beginning of the Class Period.[10]

c. FXCM's financial situation changed over the course of the Class Period such that the impact of an earlier but-for disclosure could have had different value implications for both the FXCM common stock and the FXCM Notes.

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[9] Deposition of Adam Werner, Ph.D., February 28, 2020 and June 4, 2021 ("Werner Deposition"), 443:2–22 ("Q. What corrective information do you believe could have been disclosed on March 15, 2012? A. Well I believe that Plaintiffs are contending that whatever information was disclosed on the February 7th, '17 -- 2017 could have been disclosed at the beginning of the class period. Q. And have you independently analyzed that contention and formed a belief as to whether or not that is accurate? A. Well, I have not seen any evidence to indicate that that assumption is inaccurate. Q. Do you have an opinion as to what specific corrective information could have been disclosed to the market on March 15, 2012? A. I believe Plaintiffs are maintaining that all information -- the corrective disclosures that occurred at the end of the class period could have occurred at the beginning of the class period.").

[10] Complaint, ¶ 15.

d. Finally, Dr. Werner has no basis to claim that the allegedly concealed information pertaining to FXCM's business relationship with Effex actually inflated the prices of FXCM's securities during the Class Period, let alone by the same amount as the observed price drops on February 7, 2017. Dr. Werner also has no basis to claim that had FXCM disclosed its business relationship with Effex earlier, the market would have expected the same regulatory settlement outcome as the one observed in 2017 to ensue.

16. In addition to the above flaws that apply to Dr. Werner's assessment of loss causation and calculation of damages for both the FXCM common stock and FXCM Notes, there are additional reasons why his analysis of the FXCM Notes is unreliable.

a. I previously demonstrated in the Hendershott Market Efficiency Report—and I understand the Court has agreed—that Dr. Werner has not demonstrated that the FXCM Notes traded in an efficient market throughout the Notes Period. Absent a finding of market efficiency, Dr. Werner has no basis to conclude that the price decline in the FXCM Notes on February 7, 2017 is a reliable and unbiased measure of the price impact of the information released on that date, and therefore can be used as a reliable basis to assess investor losses attributed to the information.

b. Further, Dr. Werner's assumption of "constant dollar" inflation is particularly problematic for the FXCM Notes. The price sensitivity of a fixed income security, like the FXCM Notes, to new firm-specific information depends on, among other things, the firm's financial strength. Dr. Werner himself stresses in the Werner Market Efficiency Report that when a firm is financially healthy and the likelihood of default is remote, bonds will be insensitive to all but "the most extreme [firm specific] news."[11] FXCM's financial condition changed dramatically during the Class Period, particularly following the SNB Flash Crash in January 2015. Dr. Werner thus fails to show that the alleged misrepresentations or omissions could constitute "the most extreme news"[12] and therefore would have caused any price inflation in the FXCM Notes

[11] Corrected Expert Report of Dr. Adam Werner, January 10, 2020 ("Werner Market Efficiency Report"), ¶ 137.
[12] Werner Market Efficiency Report, ¶ 137.

during the earlier portion of the Class Period.

V. Factual Background of FXCM and Effex

17. FXCM was one of the largest retail brokers in the global online FX market.[13] FXCM provided FX trading and related services to both retail and institutional investors, with retail accounting for the majority of its business.[14] Starting in July 2007, FXCM transitioned from operating as a Dealing Desk platform (*i.e.*, a principal or "DD" model) for its retail customers to operating a No Dealing Desk platform (*i.e.*, an agency model).[15] During the Class Period, FXCM stated in its SEC filings that its retail FX business primarily operated using the No Dealing Desk or agency model,[16] which it described as follows:

> When our customer executes a trade on the best price quotation offered by our FX market makers, we act as a credit intermediary, or riskless principal, simultaneously entering into offsetting trades with both the customer and the FX market maker. We earn fees by adding a markup to the price provided by the FX market makers and generate our trading revenues based on the volume of transactions, not trading profits or losses.[17]

18. According to FXCM, almost all of the other U.S. based retail FX brokers during the Class Period utilized the principal model. For example, as FXCM describes in its 2011 10-K:

> In the U.S. market, our primary competitors are Gain Capital Holdings Inc., Global Futures & FX, LLC and OANDA Corporation. They are well capitalized, have their own technology platforms and are recognizable brands. However, all of these firms

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[13] FXCM Presentation, "Research Analyst Presentation," August 17, 2010, GLBR_00103494–552 at 498.
[14] FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2012, Filed on March 18, 2013 ("FXCM 2012 10-K"), p. 1.
[15] FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2010, Filed on March 31, 2011 ("FXCM 2010 10-K"), p. 7.
[16] *See*, *e.g.*, FXCM 2012 10-K, p. 1; FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2013, Filed on March 17, 2014 ("FXCM 2013 10-K"), p. 7; FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2014, Filed on March 16, 2015 ("FXCM 2014 10-K"), p. 8; FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2015, Filed on March 11, 2016 ("FXCM 2015 Form 10-K") pp. 7–8; Global Brokerage Inc., Form 10-K for Fiscal Year Ended December 31, 2016, Filed on March 20, 2017 ("FXCM 2016 10-K"), p. 68. I also understand that FXCM offered its retail customers the option to trade with a Dealing Desk model starting in 2012. *See*, *e.g.*, FXCM 2012 10-K, p. 8 ("In 2012, in order to accommodate our expanding customer base, we began to offer our smaller retail clients the option to trade with dealing desk, or principal model execution.").
[17] FXCM 2010 10-K, p. 1.

> operate using the principal model. We also compete with smaller retail FX brokers such as FXDirectDealer, LLC, InterbankFX, LLC, MB Trading and FX Solutions. These firms, to date, have not been our core competitors due to their smaller size, technology and marketing limitations. With the exception of InterbankFX, all of these firms operate using the principal model.[18]

19. Under its No Dealing Desk model, FXCM earned profits primarily from markups to the quotes it received from liquidity providers.[19] In addition, FXCM disclosed in its SEC filings between 2010 and 2014 that it also made money from payments for order flow.[20]

20. I understand that FXCM initially hired John Dittami to establish algorithmic trading and market making services within FXCM in order to improve pricing, competitiveness, and market access for the retail customers.[21] As described in a sworn affidavit submitted by John Dittami in a litigation that Effex filed against the NFA, the primary goal of the venture was to "improve FXCM's foreign currency customer execution by providing customized liquidity solutions, in competition with other liquidity providers."[22] Mr. Dittami designed a market-making algorithm,[23] but resigned from FXCM to found his own proprietary trading firm, Effex.[24]

21. The documentary evidence in this matter shows that Effex operated as an FX liquidity provider to FXCM as well as other brokerage firms and platforms during the Class Period.[25] According to Mr. Dittami's Affidavit, he and his family members (indirectly through a trust) have owned more than 93 percent of the equity interest of Effex since its inception, and

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[18] FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2011, Filed on March 15, 2012, ("FXCM 2011 10-K"), p. 10. FXCM made similar disclosures in its 2012 and 2013 10-Ks. *See*, FXCM 2012 10-K, p. 9, FXCM 2013 10-K, p. 8. In its 2014 10-K, FXCM further states that "In the U.S. market, our primary competitors are Gain Capital Holdings Inc. and OANDA Corporation. They are well capitalized, have their own technology platforms and are recognizable brands. These firms operate using the principal model. We also compete with smaller retail FX brokers such as MB Trading. These firms, to date, have not been our core competitors due to their smaller size, technology and marketing limitations and operate using the principal model." *See*, FXCM 2014 10-K, p. 9. FXCM made similar disclosure in its 2015 10-K. *See*, FXCM 2015 10-K, p. 9.

[19] *See*, *e.g.*, FXCM 2012 10-K, p. 1

[20] FXCM 2010 10-K, p. 63; FXCM 2011 10-K, p. 65, FXCM 2012 10-K, p. 74; FXCM 2013 10-K, p. 73; FXCM 2014 10-K, p. 79.

[21] Deposition of Drew Niv, May 25, 2016 ("Niv CFTC Deposition"), 24:6–26:6.

[22] Deposition of John Dittami, *In re: Global Brokerage, Inc. F/k/a FXCM, Inc. Securities Litigation*, January 21, 2021 ("Dittami GLBR Deposition"), Exhibit 71: *Effex Capital, LLC and John Dittami v. National Futures Association et al.*, Affidavit of John Dittami, June 6, 2017 ("Dittami Affidavit"), ¶ 2.

[23] Deposition of Drew Niv, February 11, 2021 ("Niv GLBR Deposition"), 64:20–65:2.

[24] Dittami GLBR Deposition, Exhibit 19: Letter from John Dittami to William Ahdout, April 14, 2010, Effex 000046; Dittami Affidavit, ¶ 4.

[25] Dittami Affidavit, ¶¶ 14–15.

"none of FXCM's employees, officers or any affiliates of FXCM" have ever owned any equity interest in Effex.[26]

22. According to Mr. Dittami, FXCM and Effex entered into a Services Agreement in 2010,[27] pursuant to which Effex paid FXCM a monthly fixed fee per unit of volume for trades Effex executed on FXCM's platform.[28] FXCM and Effex renegotiated the monthly fee several times between June 2011 and 2014.[29] In August 2014, FXCM and Effex terminated the Services Agreement, and Effex no longer paid FXCM for order flow, though Effex continued to be a liquidity provider for FXCM.[30] FXCM subsequently disclosed in its 2014 Form 10-K that "[e]ffective August 1, 2014, [FXCM] no longer receive[d] payments for order flow."[31]

23. In January 2015, FXCM experienced dramatic changes in its business and financial condition stemming from the 2015 "flash crash" caused by the Swiss National Bank's decision to decouple the Euro and the Swiss Franc (the "SNB Flash Crash").[32] The associated losses left FXCM with insufficient capital, resulting in a breach of its regulatory capital requirements. FXCM secured emergency funding of $300 million from Leucadia National Corp. to avoid liquidation.[33]

24. In February 2017, FXCM "entered into simultaneous regulatory settlements with each of the NFA and CFTC," pursuant to which the Company withdrew from business within the

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[26] Dittami Affidavit, ¶ 10.
[27] Dittami Affidavit, ¶ 4.
[28] Dittami GLBR Deposition, Exhibit 21: "Services Agreement", May 1, 2010, Effex 000049–56 at 50.
[29] Dittami Affidavit, ¶ 11.
[30] Niv GLBR Deposition Exhibit 44: GLBR_00125304; Niv GLBR Deposition, 156:12–19 ("[I]n August 2014, we ended payment for order flow and for the next few years we still gave them the same preferences and had the same relationship, you know, minus the payment for order flow because of that -- you know, because of their, you know, ability to make our service that much more competitive.").
[31] FXCM 2014 10-K, p. 42.
[32] FXCM 2015 10-K, p. 8.
[33] Leucadia provided funding in the form of a two-year senior secured term loan with an initial coupon of 10 percent as well as certain claims to asset sales. *See*, "FX Broker FXCM Gets Rescue from Jefferies Parent Leucadia," *Reuters,* January 16, 2015, https://www.reuters.com/article/us-swiss-snb-fxcm/fx-broker-fxcm-gets-rescue-from-jefferies-parent-leucadia-idUSKBN0KP1MY20150117, accessed May 27, 2021.

U.S.[34] The Company continues to operate outside the U.S.[35]

VI. Loss Causation and Damages from the Perspective of a Financial Economist

25. A proper methodology for evaluating loss causation and calculating damages requires a financial economist to perform a multi-step analysis.

26. According to Dr. Werner, his loss causation analysis is designed to demonstrate whether "the act or omission of the defendant … caused the loss for which the plaintiff seeks to recover damages."[36] From the perspective of a financial economist, one approach to determining whether a causal link exists is to analyze the price impact of the alleged corrective disclosures. If the market for the security is efficient, this analysis can be done using an event study as an initial step, which allows a researcher to isolate a firm-specific security price return after controlling for other factors (such as industry or broader market movements) not specific to the company.[37] An event study also allows a researcher to determine whether this price movement is statistically significant, meaning sufficiently large that it is unlikely to have occurred by chance.[38]

27. However, observing a statistically significant firm-specific price decline following an alleged corrective disclosure is not in and of itself sufficient evidence that the alleged corrective disclosure caused the price decline. This is because the price decline (and any resultant investor losses) might have been caused entirely, or in part, by other firm-specific factors not related to the alleged fraud. Therefore, in order to use a statistically significant price decline associated with an allegedly corrective disclosure as a starting point for a loss causation analysis, a financial economist must identify the specific information that corrected

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[34] FXCM 2016 10-K, p. 16.
[35] FXCM 2016 10-K, p. 1. *See also,* FXCM Website, https://www.fxcm.com/markets/about-fxcm/global-broker/, accessed June 9, 2021.
[36] Expert Report of Dr. Adam Werner, April 21, 2021 ("Werner Loss Causation Report"), ¶ 27, citing the Private Securities Litigation Reform Act of 1995, 15 U.S.C. §78u-4.
[37] In an *inefficient* market new information may not be incorporated fully and rapidly into the security price and the security price return during the event window might underestimate or overestimate the value impact of the new information, or not reflect the value impact at all. In order to use an event study to reliably evaluate whether a piece of public information caused a change in the price of a firm's security, a researcher would have to assume the market price has incorporated that piece of public information in an efficient manner.
[38] MacKinlay, A. Craig. 1997. "Event Studies in Economics and Finance." Journal of Economic Literature 35 (1): 13–39 at 21.

the alleged misrepresentations or omissions (*i.e.*, the "allegedly corrective information"), separating it from other firm-specific information that is not allegedly corrective (*i.e.*, "confounding information").[39]

28. Once the allegedly corrective information is identified, an economist must then estimate the price impact, if any, that resulted from the allegedly corrective information, while parsing out the price decline caused by the confounding information. An event study that looks at only the daily residual price decline alone does not disaggregate the impact of multiple pieces of firm-specific news on a security's price. As such, in the presence of confounding information, Plaintiffs cannot rely solely on an event study, but must also conduct further analysis to separate the impact of the confounding information and isolate the price impact associated with the correction of the alleged fraud.

29. To assess any potential damages, a financial economist must analyze the difference between the actual price an investor paid for a security and the hypothetical price they would have paid absent the alleged misrepresentations or omissions (*i.e.*, the "but-for price"). This difference is typically referred to as "inflation."[40] The relevant considerations, including accounting for confounding information, also apply to calculating damages. However—even without accounting for the effect of confounding information—in order to calculate damages, a financial economist needs to assess not only the price drops on the alleged corrective disclosure dates, but also determine price inflation on each date during the Class Period, which Dr. Werner refers to as an "inflation ribbon."[41]

30. Determining the "inflation ribbon" requires a financial economist to identify the proper "but-for price" on each day during the Class Period.

31. To do so, a financial economist must consider the impact of the "but-for disclosure," *i.e.*, what the company could and should have disclosed to correct the alleged fraud at an earlier point in time. This consideration is important, especially if the economist intends to carry backward the price decline associated with the alleged corrective disclosure to

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[39] Dr. Werner acknowledges this as well. *See*, *e.g.*, Werner Loss Causation Report, ¶ 29.
[40] Dr. Werner seems to agree. *See*, *e.g.*, Werner Loss Causation Report, ¶ 86 ("The difference between what a security's price actually was at a point in time and what the price would have been absent the alleged fraud is "artificial inflation.").
[41] Werner Loss Causation Report, ¶ 88 ("An inflation ribbon is a time series indicating how much artificial inflation caused by the alleged fraud was in the security price on each day of the Class Period.").

determine the level of inflation throughout the Class Period (typically referred to as "back-casting"). To determine if one could potentially "back-cast" the price decline to measure inflation, the economist would need to compare the but-for disclosure to what was actually disclosed on the alleged corrective disclosure days.[42] To the extent the two could differ, it would be unreliable from an economic perspective to use the price decline alone as the basis for inflation throughout the Class Period.

32. In addition to assessing how the information contained in the but-for disclosure might change over time, the financial economist must consider how the value implication of the same but-for disclosure might have changed over time. A proper damages analysis would calculate inflation by assessing the value implications of the but-for disclosure at each point in the Class Period. Yet, even if the but-for disclosure remains the same, intervening events during the Class Period could have affected the value implications of the information allegedly misrepresented to the market.[43]

33. Therefore, a financial economist cannot merely assume that the level of inflation at the beginning of the Class Period was equal to the price impact, if any, on the alleged corrective disclosure date.[44] For their damages analysis to be reliable and properly supported, the financial economist must analyze whether and how much intervening events affected the level of alleged inflation.

34. Importantly, an event study alone is not necessarily sufficient to determine the level of inflation over time. A properly specified event study can be used to measure the value of firm-specific news on a particular date. It cannot be used by itself to infer the value of that same information, let alone different information, on an earlier date. This is particularly true

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[42] Dr. Werner agreed that the substance of a but-for disclosure could change during the class period. *See,* Werner Deposition, 417:20–25 ("Q. Would you agree that in conducting a loss causation analysis and damages analysis, you would need to explore the possibility that the substance of a potential corrective disclosure could change during the class period? A. As a general principle, yes.").

[43] Dr. Werner agreed that the price decline at the end of the class period might not equal the level of inflation throughout the class period. *See,* Werner Deposition, 415:17–25 ("Q. … I'm just looking for a general answer to the question of just because the price declines at the end of multi-year class period does not by itself indicate that the inflation amount reflected in that price decline was constant throughout that class period, would you agree with that statement? A. I think as a general statement that is correct.").

[44] Dr. Werner agreed at deposition that the level of inflation in a security can change over time. *See,* Werner Deposition, 413:16–20 ("Q. Would you agree that the level of inflation in a security can change over time during a class period? A. As a general statement -- as a general premise, that statement is correct.").

if the substance of the information, or the economic situation of the company or the market, varied substantially over time.

VII. Dr. Werner's Analysis of Loss Causation Is Incomplete, Flawed, and Unreliable

35. Dr. Werner's conclusion regarding loss causation is based on three factors. First, he asserts that financial principles regarding "disclosure transparency and reliability" and the "negative valuation impact of fraud" support his conclusion regarding loss causation.[45] Second, he asserts that "company and analyst statements" indicate that analysts viewed the allegedly misrepresented information as "important to the value of the Company's securities."[46] And finally, he performs what he describes as an "empirical confirmation of loss causation," in which he conducts an event study to measure the FXCM-specific security price reaction on the alleged corrective disclosure date.[47]

36. As explained below, Dr. Werner's empirical analysis of loss causation is flawed and unreliable. Crucially, Dr. Werner fails to disentangle any price decline from "collateral consequences" that were revealed on February 7, 2017 (*i.e.*, the regulatory settlement and FXCM's immediate withdrawal from its U.S. business) from price inflation that could be attributed to the alleged misrepresentations and omissions regarding FXCM's business relationship with Effex and its NDD model (**Section VII.A**). This issue is particularly relevant because, from an economic perspective, FXCM's past order flow relationship with Effex had been discontinued for more than two years and therefore had little, if any, bearing on FXCM's future cash flows. Dr. Werner fails to explain why information about a long-ended order flow relationship could have a value impact as of February 7, 2017 (**Section VII.B**). As such, Dr. Werner has no basis to conclude that his event study demonstrates that it is the correction of the alleged misrepresentations and omissions, rather than these "collateral consequences," that caused the security price reaction he measures on February 7, 2017.

37. Further, Dr. Werner's assertions regarding "financial principles" and "company and analyst statements" are vague, internally inconsistent, and ultimately do not support his conclusion on loss causation (**Section VII.C**).

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[45] Werner Loss Causation Report, ¶¶ 10, 48–51.
[46] Werner Loss Causation Report, ¶ 52.
[47] Werner Loss Causation Report, ¶ 54.

A. Dr. Werner's Event Study Analysis Fails to Disentangle the Impact of the Allegedly Corrective Information Regarding FXCM's "No Dealing Desk" from Regulatory and Other Collateral Consequences

38. Dr. Werner performs one empirical test of loss causation—an event study—and finds that the price of both the FXCM Common Stock and the FXCM Notes declined by statistically significant amounts following the alleged corrective disclosure on February 7, 2017.[48] He concludes that "the entirety of the residual declines in FXCM Securities on February 7, 2017 was caused by the…corrective disclosures and the ramifications and financial implications associated therewith."[49]

39. However, Dr. Werner's event study fails to properly address critical steps required to reliably assess loss causation, as discussed in **Section VI**. Such failures prevent him from reliably concluding that the correction of the alleged misrepresentations and omissions caused the security price declines, and hence investor losses, on this date. Crucially, an analysis of the information released on February 7, 2017, reveals that there could be multiple pieces of information conveyed to the market simultaneously. Not all of these pieces of information will necessarily have a price impact that represents removal of inflation due to the alleged fraud.

40. In particular, the CFTC's February 6, 2017 order supposedly revealed the CFTC's finding that FXCM "had an undisclosed interest in the market maker that consistently 'won' the largest share of FXCM's trading volume."[50] I note that FXCM has neither admitted nor denied such findings.[51] However, the CFTC order also disclosed the terms of the CFTC's settlement and regulatory penalty with FXCM. It "required FXCM to pay a civil monetary penalty of $7 million"[52] and included FXCM's withdrawal from the U.S.[53] Pursuant to the settlement, FXCM agreed to sell its U.S. business immediately.[54] One analyst recognized

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[48] Werner Loss Causation Report, ¶¶ 54–84.
[49] Werner Loss Causation Report, ¶ 83.
[50] Werner Loss Causation Report, ¶ 17, citing the CFTC Order.
[51] CFTC Order, Section II.
[52] Werner Loss Causation Report, ¶ 17.
[53] The settlement terms included that FXCM would "not accept new customer accounts" and that the Company would "withdraw from registration with the Commission in all capacities…" *See*, CFTC Order, Section VII.C1–3.b.
[54] On February 7, 2017, FXCM disclosed that it had signed a non-binding letter of intent with GAIN Capital Holdings Inc. to sell FXCM's U.S. customer accounts for an undisclosed amount. *See*, FXCM Inc., Form 8-K, Filed On February 7, 2017, Exhibit 99.1.

that the U.S. exit was "only slightly negative to EBITDA," but that it could have raised uncertainty with the Company, including management issues.[55] When discussing loss causation throughout his report, Dr. Werner refers to the entirety of the information disclosed on February 7, 2017, as the "corrective disclosure and *its inextricable ramifications.*"[56]

41. As explained below, from the perspective of a financial economist, Dr. Werner has not demonstrated that the price decline related to the regulatory ramifications revealed in the CFTC order represents the removal of price inflation due to the correction of the alleged misrepresentations and omissions, rather than representing "collateral consequences" arising from the alleged corrective disclosures. Dr. Werner attempts to get around this issue by asserting that (i) the entirety of the information disclosed on February 7, 2017, could have been disclosed at the start of the Class Period and (ii) the regulatory outcome was "inextricable" or "foreseeable" (terms which he does not define, but which he appears to be using to mean "certain").[57] But these conclusions have no reliable basis and are unsupported by the evidence as I understand it in this case.

1. From the Perspective of a Financial Economist, these "Collateral Consequences" May Not Represent Removal of Inflation

42. As discussed in **Section VI**, in order to use an event study to assess the impact of the correction of the alleged misrepresentations or omissions on a corrective disclosure day, an economist must conduct a careful analysis of the mix of information revealed to assess whether the price impact of each piece of information reflects the "correction," or removal of inflation due to the alleged fraud.

43. I explained in the Hendershott Market Efficiency Report why a price decline due to "collateral consequences" may not represent the removal of inflation from an economic

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[55] An analyst from Cowen & Company discussed the consequence of the settlement on the Company's financial prospects, noting: "While the U.S. operations generated $48 million in revenues in 2016, they were also EBITDA negative; if FXCM is able to reduce most of the costs associated with the U.S. business, the sale of the business may not reduce go forward EBITDA too much. But it's no sure thing they can cut costs that much…. Also, as a financial services company, it is certainly not a good thing for their ongoing foreign operations that they were pretty much forced out of the U.S. …" The analyst further commented that FXCM's "debt and equity prices put parent level solvency into question." *See*, "FXCM Settles with Regulators, Plans to Exit US. Business," *Cowen and Company*, February 7, 2017.

[56] Werner Loss Causation Report, ¶ 46.

[57] Werner Loss Causation Report, ¶¶ 7, 8, 45, 46, 54, 84, 91.

perspective. As described in my previous report,[58] collateral consequences often refer to the impact on the firm that is associated with the alleged corrective disclosure, but that one would not have expected to occur, such that they could have been included in an earlier "but-for" disclosure made by the firm. In other words, a price drop due to a collateral consequence is not informative about how much a security's price was inflated during the Class Period. Examples of collateral consequences include some regulatory penalties, concerns over corporate governance, and business disruptions.

44. Information about collateral consequences on an alleged corrective disclosure day can cause a negative stock price reaction even if there was no prior inflation in the security price. In the Hendershott Market Efficiency Report, I provided an example, *i.e.*, a company telling its investors that it owns a diamond mine worth $200 million instead of a gold mine with the same value. Had the company provided the corrective information earlier, the value of the company would not have changed, *i.e.*, there is no price inflation, assuming diamond and gold prices stayed the same. However, when a corrective disclosure is released, the stock price could still decline due to concerns over the company's internal controls or management's competence.

2. Dr. Werner Has Not Demonstrated that the Regulatory Consequences Were "Inextricable" or "Foreseeable" as He Claimed

45. Dr. Werner recognizes the compound nature of the information revealed on February 7, 2017. He notes that the CFTC press release announced both that FXCM "had an undisclosed interest in a market maker that consistently 'won' the largest share of FXCM's trading volume," but also that FXCM was required to "permanently withdraw from registration with the CFTC and CFA, not accept any new customer accounts, [and] pay a civil monetary penalty of $7 million."[59]

46. However, rather than attempting to parse out the impact of the alleged corrective statements regarding FXCM's business relationship with Effex from the "collateral consequences" in the form of the regulatory settlement outcome, Dr. Werner instead

[58] Expert Report of Terrence Hendershott, PhD., June 12, 2020 ("Hendershott Market Efficiency Report"), ¶ 101.
[59] Werner Loss Causation Report, ¶ 42.

concludes that "the entirety of the residual declines" on February 7, 2017 were caused by the "corrective disclosures and the ramifications and financial implications associated therewith."[60]

47. The rationale Dr. Werner provides for this conclusion is that the regulatory ramifications (meaning the regulatory action) were "inextricable" and "foreseeable."[61] Dr. Werner has testified that separating these "ramifications" from the allegedly "corrective" information would be "next to impossible," as he sees the outcome as being "inextricably linked" (*i.e.*, expected with certainty) once the alleged misrepresentations occur.[62] Without any empirical analysis or other reliable basis, Dr. Werner relied on an analogy to an individual who commits a murder, *i.e.*, that someone who commits murder (or is thinking about committing murder) would have an expectation they might go to jail, even if the judicial process had not begun, let alone was not completed.[63]

48. Dr. Werner also testified that it was his understanding that Plaintiffs contend that "whatever information was disclosed on February 7, 2017," including the regulatory action and ultimate settlement outcome, "could have been disclosed at the beginning of the class period."[64] Despite basing his analysis on this assumption, Dr. Werner has not conducted any

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[60] Werner Loss Causation Report, ¶ 83.
[61] Werner Loss Causation Report, ¶¶ 7, 91.
[62] Werner Deposition, 484:11–23 ("Q. And did you assume that both of these pieces of information contributed to the decline of the price for the FXCM securities? ... A. I mean, I think my report speaks for itself with regards to that question. Q. Did you attempt to quantify the price impact of each of those pieces of information separately? A. Well, to the extent that I believe they are inextricably linked, I don't think it's -- it would be very difficult or next to impossible to do that type of analysis.").
[63] Werner Deposition, 469:24–470:18 ("Q. Is it your opinion that it was foreseeable to FXCM in March of 2012 that they would enter into a settlement with the CFTC which would involve amongst other things withdrawal from the US market? … A. Right. So I refer to my previous answers. I mean, certainly, the Plaintiffs contend that that was foreseeable. I haven't seen any evidence to suggest that it wasn't foreseeable to the extent -- to the same extent that I talked about a 'murder' – an example using 'murder' previously, you know. If I think about murdering somebody and then actually do it five years later, do I know when I'm thinking about it that I can go to jail for murdering somebody? Yeah, I know – I know that.").
[64] Werner Deposition, 443:2–22 ("Q. What corrective information do you believe could have been disclosed on March 15, 2012? A. Well I believe that Plaintiffs are contending that whatever information was disclosed on the February 7th, '17 -- 2017 could have been disclosed at the beginning of the class period. Q. And have you independently analyzed that contention and formed a belief as to whether or not that is accurate? A. Well, I have not seen any evidence to indicate that that assumption is inaccurate. Q. Do you have an opinion as to what specific corrective information could have been disclosed to the market on March 15, 2012? A. I believe Plaintiffs are maintaining that all information -- the corrective disclosures that occurred at the end of the class period could have occurred at the beginning of the class period.").

analysis to determine whether it makes economic sense. I understand from counsel that the Court dismissed the Plaintiffs' allegations that FXCM made misstatements about the status of the regulatory investigation, stating that "companies do not have an affirmative duty 'to speculate or disclose uncharged, unadjudicated wrongdoings or mismanagement….'"[65] In addition, for the reasons I discuss below, the evidence as I understand it suggests the ultimate outcome of the regulatory investigation, and its impact on FXCM, was far from certain during the Class Period. Moreover, I understand that Plaintiffs have not demonstrated that FXCM was aware of the CFTC investigation until October 2014—two years after the beginning of the Class Period.[66]

49. From the perspective of an economist, if these "ramifications" were not necessarily expected and were uncertain (*i.e.*, had the Company made an earlier but-for disclosure, the regulatory ramifications could have been the same, completely different, or not occurred at all), then there is no reliable basis to claim that their price impact represents removal of price inflation.

50. As a starting point, Dr. Werner conducts no analysis and presents no evidence to support his opinion that a regulatory action was "inextricable" and "foreseeable," other than his flawed analogy. He has not demonstrated that his "murder analogy" has any relevance to the specific facts of this case. Plaintiffs assert that "FXCM knew it was under investigation by the CFTC and NFA as early as October 2014, when the CFTC sent FXCM a Request for Production seeking documents concerning Effex's relationship with FXCM."[67] Yet, Dr. Werner offers no evidence that FXCM even knew about or otherwise expected the CFTC investigation before October 2014. My understanding from counsel is that payment for order flow arrangements were not prohibited under the CFTC rules and regulations at the time, a fact with which Dr. Werner appears to agree.[68] Dr. Werner has offered no basis to conclude that FXCM, let alone market participants, had they known the alleged "truth" about the relationship with Effex before October 2014, would have expected an imminent regulatory

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[65] Opinion & Order Class Action, *In re Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*, March 28, 2019 ("Opinion on Motion to Dismiss"), pp. 28–29.
[66] Complaint, ¶ 15.
[67] Complaint, ¶ 15.
[68] Werner Deposition, 477:3–7 ("Q. … I believe I asked you before and you conceded that pay for flow arrangements in general weren't prohibited under the CFTC applications rules and regulations, correct? A. I believe that's what I stated, yes.").

action.

51. Further, Dr. Werner has not demonstrated that the regulatory penalties and the settlement outcome are tied to the alleged misstatements or omissions. It is my understanding that FXCM never admitted any wrongdoing.[69] And Dr. Werner fails to consider that a particular settlement outcome could also have been driven by factors that were unrelated to the allegations, such as the company's cooperation with the investigation, its negotiations with the regulators, or its other business considerations.[70] He fails to explain how the situation is comparable to his murder analogy, where there is a purportedly unambiguous violation and associated prescribed penalty.

52. Even if for argument's sake one were to assume that either FXCM or market participants would have believed that a regulatory action and penalty of some kind were plausible or likely had the Company disclosed its business relationship with Effex, Dr. Werner has not demonstrated that the nature of the outcome (*i.e.*, FXCM's withdrawal from operating in the U.S.) could have been expected *ex ante*. At deposition, Dr. Werner could not point to any public precedent regarding CFTC regulatory enforcement proceedings that addressed similar issues related to order handling practices, payment for order flows, and related disclosure for retail FX brokerages.[71]

53. As mentioned previously, according to FXCM, almost all U.S.-based FX retail

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[69] The CFTC Order included language specifically indicating that FXCM was not admitting to the findings of the CFTC. *See*, CFTC Order, Section II ("Without admitting or denying the findings or conclusions herein, Respondents consent to the entry and acknowledge service of this Order Instituting Proceedings Pursuant to Sections 6(c) and 6(d) of the Commodity Exchange Act, Making Findings, and Imposing Remedial Sanctions."). *See also*, CFTC Order, Section II, footnote 1 ("Nor do Respondents consent to the use of the Offer or this Order, or the findings or conclusions in this Order consented to in the Offer, by any other party in any other proceeding.").

[70] For example, during his deposition Dr. Werner suggested that FXCM allegedly "lying" about the Company's no dealing desk factored into the settlement outcome. *See*, Werner Deposition, 446:7–11 ("Oh, I left out FXCM lying about the fact that they had a no deal desk. Because I think the lying actually played a part in the analyst -- I'm sorry, in the regulatory body's decisions."). *See also*, Werner Deposition, 447:4–11 ("Look if they hadn't lied [sic] about it, you know it's not -- presumably, the regulators may not have come down on them that hard and market participants wouldn't have said, oh, these guys are teetering on the edge of bankruptcy or they may not be solvent. So I'm not -- as I sit here today, I'm not quite sure how to parse that out.").

[71] Werner Deposition, 468:4–11 ("Q. Dr. Werner, in connection with your analysis for loss causation and damages submitted in your report, did you review any prior CFTC settlements to see if similar penalties [sic] were imposed in comparable cases? … A. No, I did not. Q. And did you review any prior court decisions in cases brought by the CFTC to see if similar penalties [sic] were imposed in comparable cases? … A. Alright. So maybe I should give a little clarification. In the context of this case, no. …").

brokers were using a principal model during the Class Period,[72] and FXCM was viewed as distinctly positioned in retail FX because of its use of an agency model.[73] I am not aware of any prior CFTC settlement—and Dr. Werner certainly has failed to provide any—that addressed the same or similar issues in the FX industry.[74] As such, it is not clear how such a penalty or settlement outcome could be expected by either the market or the management *ex ante*.

54. Dr. Werner conceded during his deposition that the regulatory penalties imposed for an alleged violation or settlement outcomes can vary substantially.[75] And settlement outcomes and regulatory actions can be impacted by many factors. For example, a different outcome might have ensued had the alleged misstatements or omissions about FXCM's relationship with Effex been disclosed, say, in 2012 versus 2015. Consistent with this, I understand from counsel that there is not a statute providing a specific pre-defined (and therefore knowable) consequence that results from a CFTC violation, and that the outcome was rather the result of bilateral negotiation between the CFTC and FXCM.

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[72] For example, in its 2011 10-K, FXCM states that "[i]n the U.S. market, our primary competitors are Gain Capital Holdings Inc., Global Futures & FX, LLC and OANDA Corporation. They are well capitalized, have their own technology platforms and are recognizable brands. However, all of these firms operate using the principal model. We also compete with smaller retail FX brokers such as FXDirectDealer, LLC, InterbankFX, LLC, MB Trading and FX Solutions. These firms, to date, have not been our core competitors due to their smaller size, technology and marketing limitations. With the exception of InterbankFX, all of these firms operate using the principal model." *See*, FXCM 2011 10-K, p. 10. FXCM made similar disclosures in its 2012 and 2013 10-Ks. *See*, FXCM 2012 10-K, p. 9; FXCM 2013 10-K, p. 8. In its 2014 10-K, FXCM further states that "[i]n the U.S. market, our primary competitors are Gain Capital Holdings Inc. and OANDA Corporation. They are well capitalized, have their own technology platforms and are recognizable brands. These firms operate using the principal model. We also compete with smaller retail FX brokers such as MB Trading. These firms, to date, have not been our core competitors due to their smaller size, technology and marketing limitations and operate using the principal model." *See*, FXCM 2014 10-K, p. 9. FXCM made similar disclosure in its 2015 10-K. *See*, FXCM 2015 10-K, p. 9.

[73] "Going Principal (At Least Partially)," *UBS,* August 9, 2012, p. 3 ("…after years of differentiating itself as an agency-only platform…").

[74] Werner Deposition, 468:23–469:6 ("Q. Were you aware generally of any comparable cases where a foreign exchange broker withdrew from the US markets? A. That's an interesting question. … Not as I sit here today.").

[75] Werner Deposition, 456:7–11 ("Q. And would you agree that regulatory penalties for any alleged violations could vary depending on several factors in connection with a negotiation with regulators? A. As a general principle, yeah.").

B. Dr. Werner Has Not Established that the Allegedly Corrective Information, Absent the Collateral Consequences, Would Be Value Relevant to Investors on the Alleged Corrective Disclosure Date

55. As discussed above, Dr. Werner has failed to show the "collateral consequences" in the form of FXCM's regulatory settlement with the CFTC/NFA and withdrawal from the U.S. represent the removal of inflation. He thus also fails to recognize that any impact from these collateral consequences would need to be separated from the FXCM securities' price decline on February 7, 2017 in order to assess loss causation. In the Werner Market Efficiency Rebuttal Report, Dr. Werner claims that "valuation tools" can be used to address all the "valuation complexities" I raised in the Hendershott Market Efficiency Report.[76] In his discussion of loss causation, for example, he stated that "valuation tools can be used to remove the effect of confounding information from the price decline, if any."[77]

56. However, Dr. Werner has not attempted to apply any such tools to determine the value implications of the alleged misstatements regarding FXCM's business relationship with Effex, separate from any regulatory consequences. In fact, if one examines the cash flow implication of the information released on the alleged corrective disclosure date carefully, it is not clear—and Dr. Werner has not shown—that the allegedly corrective information, absent the collateral consequences, would have been value-relevant to investors. This provides further evidence why Dr. Werner's analysis based on an event study alone does not provide a reliable assessment of loss causation.

57. As explained below, Dr. Werner has not demonstrated that the information revealed in February 2017 regarding the Company's past order flow relationship with Effex or its potential implications for FXCM's NDD platform would have future cash flow implications for the firm. He fails to explain why FXCM's disclosure of its business relationship with Effex would necessarily have had negative value implications from the perspective of an investor in FXCM securities. Finally, Dr. Werner has not provided evidence that consolidating Effex into FXCM's balance sheet during the Class Period, which I understand Plaintiffs' accounting expert asserts should have been done, would have negative cash flow implications.

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[76] Expert Report of Dr. Adam Werner, July 27, 2020 ("Werner Market Efficiency Rebuttal Report"), ¶ 85.

[77] Werner Loss Causation Report, ¶ 29.

1. It Is Not Clear that a Disclosure on February 7, 2017 About FXCM's Historical Order Flow Relationship with Effex Would Have Future Cash Flow Implications, Absent Collateral Consequences

58. A basic principle of finance is that a piece of information is value-relevant if it has an impact on the present value of the future cash flows of a company.[78] The price reaction to a piece of information hence reflects how that information changes either stockholders' or FXCM Notes holders' assessment of *future* cash flows that they will likely receive or their risk. Dr. Werner claims that through the alleged corrective disclosure, "the market learned the truth about the Company's purportedly conflict-free agency model," *i.e.*, that "FXCM was receiving most of the profits from the market maker capturing the highest proportion of its trading volume through its order flow relationship with Effex."[79]

59. I understand that Defendants have retained a separate industry expert to address Plaintiffs' allegations, including with respect to the business relationship with Effex and FXCM's NDD model. However, even assuming for argument's sake that Plaintiffs and Dr. Werner were correct that the market learned the "truth" regarding FXCM's past order flow relationship with Effex and considered it as creating a conflict with FXCM's NDD model, Dr. Werner has not provided any analysis to connect the disclosure of this *past* order flow relationship to any impact on FXCM's *future* cash flows or their risk, absent collateral consequences.

60. FXCM's "order flow arrangement [with Effex] came to a halt" in August 2014,[80] and FXCM further disclosed to the public in November 2014 that it no longer received payments for order flow as of August 1, 2014.[81] Both of these events occurred more than two years prior to the alleged corrective disclosure. If the "order flow arrangement" between FXCM

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[78] "In finance the value of the firm is its ability to generate financial cash flow…. One way to think about the question of how much a firm is worth is to calculate the present value of its future cash flows." *See*, Ross, Stephen A. et al. 2003. *Corporate Finance*. 6th Edition. McGraw-Hill Irwin, pp. 28, 94.

[79] Werner Loss Causation Report, ¶ 91.

[80] Opinion on Motion to Dismiss, p. 21. The Company also disclosed publicly that it had discontinued payments for order flows by Q3, 2014. *See*, "Global Brokerage, Inc. OTCPK:GLBR FQ3 2014 Earnings Call Transcripts," S&P Global Market Intelligence, November 6, 2014, p. 7; Niv GLBR Deposition, Exhibit 44, GLBR_00125304; Niv GLBR Deposition, 156:12–19.

[81] "Beginning in August 2014, we no longer receive payments for order flow." *See*, FXCM Inc., Form 10-Q, for Quarterly Period Ended September 30, 2014, Filed On November 7, 2014, p. 45.

and Effex, which Plaintiffs claim to be the core issue that caused conflict with FXCM's agency model, ended in 2014, one would not expect, and Dr. Werner has failed to show, that its disclosure would have future cash flow implications for FXCM or a security price impact as of February 7, 2017.

61. Relatedly, Dr. Werner states in his report that the alleged corrective disclosures revealed "the truth about the Company's purportedly conflict-free agency model, and the ramifications associated therewith, including that the Company's business model would no longer be sustainable."[82] He does not specify as to which part of FXCM's "business model" he is referring to, and at deposition clarified that he is using the term in the "general sense."[83] Nor does he explain why this "business model" would "no longer be sustainable." At deposition, Dr. Werner indicated that this included FXCM's "agency model."[84] However, it is not clear what basis he has to claim this was not sustainable, given that as of February 2017, FXCM had been operating without any "order flow arrangement" with Effex for more than two years.

2. Dr. Werner Has Not Demonstrated that an Earlier Disclosure Regarding FXCM's Relationship with Effex and Its NDD Model Would Have Caused Security Price Declines

62. Even if FXCM's order flow relationship with Effex had still been ongoing at the time of a hypothetical but-for disclosure, Dr. Werner has not demonstrated that such a disclosure would have had negative value implications for investors in FXCM securities.

63. Dr. Werner has conducted no analysis and presented no evidence demonstrating how a hypothetical disclosure about FXCM's relationship with Effex would have been viewed by

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[82] Werner Loss Causation Report, ¶ 91.

[83] Werner Deposition, 437:10–23 ("Q. Are you referring to, for instance, the no dealing desk, forex trading generally, their operations in the United States, their operations globally? Which specific 'business model' are you referring to? A. Well, those are all part of its business model, correct? Q. So you are referring to all of those when you say that 'market participants were misled about the viability and sustainability of FXCM's business model'? A. I believe 'business model' -- I mean I'm using that in the general sense of 'business model.'").

[84] Werner Deposition, 437:10–438:3 ("A. I believe 'business model' -- I mean I'm using that in the general sense of 'business model.' I mean, does that include FXCM's claim that they were -- that they had an NDD platform? That certainly would be one of them. That's certainly part -- my understanding is that's part of their 'business model' among other things.").

investors. As mentioned earlier, I understand that the aim of FXCM's business relationship with Effex was to enhance customers' trading experience by improving the competitiveness, pricing and other features of the liquidity provision to FXCM customers.[85] I understand that an internal FXCM analysis found that Effex "improved FXCM's pricing for the benefit of FXCM's clients."[86] FXCM also disclosed that it received payments for order flow in its SEC filings.[87] Dr. Werner has provided no reliable evidence to suggest that had FXCM disclosed the full extent of its order flow relationship and business agreements with Effex, such a disclosure would have been viewed negatively by its customers or investors.

64. Plaintiffs assert that the order flow relationship with Effex created a conflict with FXCM's agency model.[88] However, even assuming Plaintiffs are correct that FXCM should have disclosed that it was no longer operating under a pure agency model, Dr. Werner still fails to provide any reliable basis to claim that such a disclosure would necessarily have elicited a negative security price reaction, let alone a negative reaction that is comparable to the one observed on February 7, 2017.

65. As discussed earlier, FX brokerage firms used different trading models, and most of FXCM's U.S. based competitors, including Gain Capital and OANDA, used a principal model/DD during the Class Period. FXCM itself operated on a principal model prior to 2007 and switched to a hybrid model in 2015. Indeed, market participants seem to have viewed each model to be associated with certain pros and cons depending on market conditions and economic circumstances: For example, FXCM's agency model was viewed by some analysts as one of the contributing factors to the large and adverse impact on FXCM following the SNB Flash Crash in January 2015.[89] Additionally, when FXCM switched in March 2015 from purely an agency model to a "hybrid" model which included a "dealing desk" for some

[85] Niv CFTC Deposition, 24:6–26:6.
[86] FXCM Memorandum, "Analysis of Benefit to FXCM Clients," February 13, 2015, GLBR_00041750–2.
[87] *See, e.g.*, FXCM 2012 10-K, p. 74.
[88] Werner Loss Causation Report, ¶ 91.
[89] "Thoughts on Leucadia and the Capital Infusion--Lowering TP and 2015 Estimates," *Credit Suisse*, January 20, 2015, p. 6.

retail customers, it was viewed positively by some analysts.[90,91] For example, Barclays commented that:

> [T]he company will launch a hybrid desk model (option to trade on principal basis) for small retail customers with less than $20k in deposits. FXCM hopes to retain and gain market share in this important (though small) portion of their client base as they were the quickest to recover post the January 15 event. As smaller clients represent lower risk for FXCM in the principal model, this initiative is expected to contribute to the company's capture rate and profitability.[92]

Moreover, FXCM's June 2012 acquisition of the liquidity provider Lucid Markets Trading in its institutional trading segment (which gave FXCM an interest in a liquidity provider engaged in principal trading) was also viewed positively by some analysts.[93]

66. In sum, Dr. Werner has presented no reliable analysis to measure the impact of a hypothetical disclosure about FXCM's order flow relationship and business agreement with Effex or its NDD model. He thus has no reliable basis to claim that the alleged misrepresentations and omissions pertaining to FXCM's order flow relationship with Effex or its NDD model actually inflated FXCM's security prices during the Class Period.

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[90] Note that I do not suggest that the principal risk FXCM took in small retail trades after March 2015 was equivalent or similar to that in its arrangement with Effex. I use this example to illustrate that the value implications of a "but-for" disclosure regarding FXCM's NDD model are complex and that Dr. Werner has failed to put forth any methodology to address this issue.

[91] Credit Suisse stated that "they will transition to a hybrid dealing desk model for clients with account balances lower than $20,000, which will allow them to offer greater leverage to such clients and retain this small but profitable client segment. It should be noted this is a reversal from the firm's previous strategy both to operate a pure agency model and focus on clients with larger account balances." *See*, "4Q14 Results and Business Update; Lowering TP," *Credit Suisse*, March 13, 2015, p. 3.

[92] "Focused on the Opportunity Set Available," *Barclays*, March 13, 2015, p. 3.

[93] FXCM 2012 10-K, pp. 1, 24 ("FXCM acquired a "50.1% controlling interest in Lucid Markets Trading Limited, an electronic market- maker and trader in the institutional FX market."); "Lucid, A 'Clearly' Attractive Deal," *Credit Suisse*, June 14, 2012, p. 1 ("Strategically, the transaction makes a lot of sense to us–we believe the deal represents a meaningful step forward for FXCM in terms of bolstering their institutional presence."); "Growing Institutional Offering Through Acquisition," *Barclays*, June 14, 2012, p. 1 ("We view the deal as a clear positive for FXCM, building on the company's solid track record of M&A in the retail space to grow the institutional business in this case."); "Strengthening Institutional Business in Highly Accretive Fashion," *UBS*, June 14, 2012, p. 1 ("We are not surprised to see a positive reaction in the shares this morning, but believe there is more upside potential once investors fully appreciate the financial and non-financial benefits.").

3. Dr. Werner Has Not Demonstrated that Consolidating Effex as a VIE Would Have Negative Value Implications

67. I understand that Plaintiffs also allege that FXCM failed "to consolidate Effex's financial statements and make the required disclosures, including information about FXCM's involvement with Effex, as required by GAAP, [which] caused FXCM's consolidated financial statements to be materially misstated."[94]

68. I note that there has not been any alleged corrective disclosure that "corrected" the alleged GAAP violation: FXCM has not issued any restatements to its financial statements for the fiscal years 2011 through 2014 and the CFTC Order did not address any issues with the accounting in FXCM's financial statements.[95] In his report, Dr. Werner does not specify what information should have been included in any but-for disclosure FXCM could and should have made to correct the alleged misrepresentations and omissions (which is discussed in further detail in **Section IX.A** below) related to GAAP violations. However, to the extent that Plaintiffs are asserting that the but-for disclosure would include FXCM's consolidation of Effex for financial reporting purposes throughout the Class Period, it is not clear that such consolidation would have had any negative value implications for FXCM's shareholders.[96]

69. Plaintiffs and their accounting expert, Mr. Barron, assert that the financial statements of FXCM were misstated, beginning with the year ended December 31, 2010, through the year ended December 31, 2014, for two main reasons: (1) FXCM failed to disclose the transactions with Effex as related party transactions and (2) FXCM failed to consolidate the financial statements of Effex and make disclosures required by GAAP.[97] However, Mr. Barron states that "[a]t first blush, the consolidation of Effex, would not seem to negatively

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[94] Expert Report of John E. Barron, CPA ("Barron Report"), ¶ 12.
[95] CFTC Order.
[96] Note that I was not asked to evaluate the validity of the allegations that Effex should have been consolidated as a variable interest entity. I am only commenting on the potential valuation implications if consolidation had occurred during the Class Period, and pointing out the fact that Dr. Werner has not addressed this question. In deposition, Dr. Werner conceded that he had not analyzed this point. *See,* Werner Deposition, 424:14–23 ("Q. Did you analyze in connection with the scope of work for your retention as an expert in this matter whether consolidating Effex into FXCM's financial reporting would negatively affect FXCM's financials? A. Same answer. Q. And to be clear, the 'same answer' that you're referring to was, 'that's not my purview'; is that correct? A. I believe that's what I stated….").
[97] Barron Report ¶¶ 6, 10, 12.

impact FXCM's consolidated statements of operations… reported revenues would increase and net income attributable to FXCM's shareholders would remain unchanged."[98]

70. Given there is no alleged corrective disclosure that is tied to the alleged GAAP violations, Dr. Werner has not explained how he can use any price drop associated with the alleged corrective disclosure to assess loss causation or damages associated with Plaintiffs' GAAP-related allegations. Furthermore, if consolidation would not have negatively impacted FXCM's financial results, as Mr. Barron opines, then it is not clear how Dr. Werner could conclude that allegations regarding FXCM's consolidation of Effex into its financial statements inflated the FXCM security prices in the first place.

71. In sum, Dr. Werner fails to show that the alleged failure to consolidate the financial statements of Effex or any other alleged GAAP violations inflated FXCM's security prices or caused investor losses, especially based on Plaintiffs' accounting expert's own admissions.

C. Dr. Werner's References to "Financial Principles" and "Company and Analyst Statements" Do Not Demonstrate Loss Causation

72. In addition to conducting an event study, which Dr. Werner refers to as an "empirical" analysis of loss causation, he also relies on what he refers to as "generally accepted principles of valuation, Company statements, analyst reports, [and] analysts' valuation models"[99] to reach his conclusion that the "corrective disclosure and its inextricable ramifications… caused investor losses."[100] However, Dr. Werner's application of "financial principles"[101] and his purported analysis of "company and analyst statements"[102] are vague, internally inconsistent, and do not support his loss causation conclusion.

1. "Financial Principles"

73. Dr. Werner purports to apply two "financial principles" to his evaluation of loss causation, which he describes as "disclosure transparency and reliability" and the "negative

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[98] Barron Report, ¶ 149.
[99] Werner Loss Causation Report, ¶ 47.
[100] Werner Loss Causation Report, ¶ 46.
[101] Werner Loss Causation Report, ¶ 48, Section A. "Financial Principles".
[102] Werner Loss Causation Report, ¶ 52, Section B. "Company and Analyst Statements".

valuation impact of fraud."[103]

74. First, regarding "disclosure transparency," Dr. Werner states that it is well established in the academic literature that "truthfulness and reliability of [a] Company is an important factor that affects the value of a company's securities."[104] Dr. Werner cites to excerpts from two academic papers which he claims explain "how accurate and transparent information disclosure by management, can lower the cost of capital for a company, and increase the value of a company's securities."[105]

75. To the extent that Dr. Werner is asserting that more transparent disclosures are necessarily value-positive, such an assertion contradicts his own loss causation claims: under his logic, more transparency in FXCM's business dealings in the but-for scenarios should have *increased* the securities prices rather than causing a price decline. Dr. Werner therefore has no basis to claim that "the security prices would have declined then just as they did upon their ultimate disclosure" upon a but-for disclosure.[106]

76. Separately, Dr. Werner's assertion ignores the academic evidence that a greater level of disclosure is not always better, particularly if it results in costly revelation of proprietary business information to competitors or other market participants.[107] For example, multiple studies have found that "proprietary costs" in a competitive environment are an important factor in firms' disclosure choices (*i.e.*, potentially withholding disclosures) regarding information about customers or sales and costs.[108]

77. Second, regarding the "negative valuation impact of fraud," Dr. Werner states that "the ramifications of a fraud extend well beyond the direct dollar amount of the fraud, but also cause further loss on account of damage to a company's business and prospects."[109] He cites a Gillet (2009) paper discussing fraud leading to "management integrity and

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[103] Werner Loss Causation Report, ¶ 48–51.
[104] Werner Loss Causation Report, ¶ 48.
[105] Werner Loss Causation Report, ¶49, *see also*, ¶¶ 48, 50–51.
[106] Werner Loss Causation Report, ¶ 49.
[107] Healy, Paul M., and Krishna G. Palepu. 2001. "Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature," *Journal of Accounting & Economics* 31, 2001: 405–40 at 420–425.
[108] Ellis, Jesse A., et al. 2012. "Proprietary Costs and the Disclosure of Information About Customers." Journal of Accounting Research 50 (3): 685–728 at 685; Dedman, Elisabeth and Clive Lennox, "Perceived Competition, Profitability and the Withholding of Information About Sales and the Cost of Sales." Journal of Accounting & Economics 48: 210–230 at 210.
[109] Werner Loss Causation Report, ¶ 50.

competence" being called into question, and the firm potentially suffering "reputational damage."[110] He also cites Karpoff (2008) that "when fraud is disclosed, the damage to a firm's reputation, business, and prospects has negative valuation impact."[111]

78. As an initial matter, Dr. Werner provides no basis to claim that the hypothetical, alternative disclosure by FXCM at an earlier point in time during the Class Period would involve a disclosure of "fraud." Even assuming that were the case, these arguments relating to the ramifications of fraud touch on precisely the issue of "collateral consequences," such as governance or reputational effects, that I discuss in **Section VII.A.1**. To the extent that these "collateral consequences" would not have been expected to occur under an earlier, "but-for" disclosure made by FXCM, any such price declines caused by collateral consequences would not represent removal of inflation.

2. "Company and Analyst Statements"

79. Dr. Werner also purports to rely on a review of company and analyst statements to support his finding of loss causation. He states that "[c]onsistent with the fundamental valuation principles set forth above, the Company and analysts considered information about the desirability of the agency model, the source of the Company's revenues, level of regulatory scrutiny, transparency of accounting, and management's credibility to be important to the value of the Company's securities."[112]

80. Dr. Werner's claims regarding company and analyst statements are speculative and unsupported. Dr. Werner does not cite a single analyst report or company statement when making the above claims.[113] In fact, throughout his entire report, he cites only three analyst reports: one report from 2012 authored by BGB Securities,[114] and two reports from 2017 authored by Cowen and Company and Oppenheimer, both of which were issued following the alleged corrective disclosure.[115] For the two reports in 2017, these analysts do not address the "desirability of the agency model,"[116] which is not surprising given that FXCM

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[110] Werner Loss Causation Report, ¶ 50.
[111] Werner Loss Causation Report, ¶ 51.
[112] Werner Loss Causation Report, ¶ 52.
[113] Werner Loss Causation Report, ¶ 52.
[114] Werner Loss Causation Report, ¶ 35.
[115] Werner Loss Causation Report, ¶ 44.
[116] Werner Loss Causation Report, ¶ 52.

had discontinued the "pure" agency model over two years earlier. Rather, Cowen, in discussing the "updates to our calculator" discusses FXCM's plans to sell the U.S. business and pay down debt.[117] Oppenheimer, in a report covering Leucadia rather than FXCM, reiterates the CFTC allegations and notes that "the misconduct seems to have occurred from 2009-2014" (*i.e.*, in the past).[118]

81. In sum, Dr. Werner provides no reliable evidence from "financial principles" or "company and analyst statements" to suggest that the alleged misrepresentations and omissions caused investors losses or inflated the price of FXCM's securities.

VIII. Dr. Werner's Use of an Event Study in His Loss Causation Analysis for the FXCM Notes is Flawed and Inappropriate

82. The issues with assessing loss causation discussed in **Section VII** above apply to both the FXCM Notes and FXCM's common stock. For the FXCM Notes, there are additional reasons why Dr. Werner's application of an event study to assess loss causation is flawed. Crucially, Dr. Werner cannot use an event study to draw a cause and effect conclusion between the revelation of the allegedly corrective information and the FXCM Notes price reaction absent assuming (or establishing) that the FXCM Notes traded in an efficient market. Absent market efficiency, Dr. Werner has no basis to conclude that the price decline in the FXCM Notes on February 7, 2017 is a reliable and unbiased measure of the price impact of the information released on that date. Additionally, I raised further methodological concerns regarding Dr. Werner's implementation of his event study model for the FXCM Notes in the Hendershott Market Efficiency Report that Dr. Werner has not addressed.

A. Dr. Werner's Use of an Event Study is Inappropriate Given that He Has No Basis to Assume (and Has Not Shown) that the FXCM Notes Traded in an Efficient Market

83. In an efficient market, "prices always 'fully reflect' available information" and

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[117] "FXCM Settles with Regulators, Plans to Exit U.S. Business," *Cowen and Company*, February 7, 2017, pp. 2–3.
[118] "Leucadia National Corporation: FXCM Negative Developments But Likely a Relatively Small Financial Impact on LUK," Oppenheimer, February 7, 2017.

security prices rapidly adjust to incorporate new information.[119] However, not all securities markets are efficient at all points in time. There is well-documented evidence that even securities that are well covered, listed on exchanges, and traded in relatively liquid markets may not always be efficient.[120]

84. Dr. Werner opined in the Werner Market Efficiency Report that the market for the FXCM Notes was efficient throughout the Notes Period.[121] In the Hendershott Market Efficiency Report, I explained that Dr. Werner's flawed and deficient analysis did not provide reliable evidence showing that the FXCM Notes traded in an efficient market.[122]

85. My understanding is that the Court ruled that "plaintiffs have not established that the FXCM Notes traded in an efficient market."[123] Consistent with my analysis, the Court noted that:

> No analysts followed the FXCM Notes (as opposed to the FXCM Stock), and none of the ratings agencies rated them. Moreover, the volume and the frequency of the trading decreased over the course of the Notes Period, with the volume dipping below the Cammer Benchmarks after October 2015. The only direct evidence of market efficiency in the record… is Dr. Werner's event study, which is of limited utility due to the nature (and timing) of the two events chosen.[124]

86. This finding with respect to market efficiency for the FXCM Notes has implications for Dr. Werner's ability to use an event study in his loss causation and damages analysis. As explained in an article on the event study methodology, "[t]he usefulness of such a study comes from the fact that, given rationality in the marketplace, the effects of an event will be reflected immediately in security prices. Thus a measure of the event's economic impact can

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[119] Fama, Eugene F. 1970. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance* 25 (2): 383–417 at 383.
[120] Hendershott Market Efficiency Report, ¶ 23.
[121] Werner Market Efficiency Report, Section III, Opinion II.
[122] Hendershott Market Efficiency Report, ¶¶ 16–94. As explained there, Dr. Werner failed to account for the fact that the market for the FXCM Notes was decentralized, more opaque, and less liquid than would generally be the case of stock markets. Further, his assessment of the *Cammer* and *Krogman* factors was flawed. In particular, he ignored that liquidity and analyst coverage of the FXCM Notes declined dramatically during the Class Period. Moreover, his purported assessment of *Cammer* Factor No. 5 (price reaction to new information) only examined two events over a two-and-a-half-year class period, and Dr. Werner failed to address that the FXCM Notes did not trade at all on several of his so-called "news" days. Hendershott Market Efficiency Report, ¶¶ 12-13.
[123] Report and Recommendation, p. 37.
[124] Report and Recommendation, p. 37.

be constructed using security prices observed over a relatively short time period."[125] Put another way, in order to use an event study to evaluate a cause and effect relationship between an event and a change in a firm's securities price (what Dr. Werner purports to do in his loss causation analysis), a researcher must assume, or demonstrate, market efficiency.

87. This is because absent market efficiency, Dr. Werner has no basis to conclude that the price decline observed for the FXCM Notes on February 7, 2017, is a reliable and unbiased measure of the price impact of the information released on that date. If the market fails to react to a certain type of information rapidly and fully, then the residual returns from an event study following the release of the information will not be instructive to measure the value impact of that information. Unless the new information is incorporated *fully* and *rapidly* in the security price, the security return during the event window might underestimate or overestimate the value impact of the new information, or not reflect the value impact at all. During his deposition, Dr. Werner conceded that it is possible for a security to underreact or overreact to news.[126] Additionally, if a security price does not rapidly and fully incorporate new information, Dr. Werner has no basis to conclude that the security price reaction on February 7, 2017, represents the price impact of the information released on that date.

88. In this instance, the Court found that Dr. Werner had not demonstrated that the FXCM Notes traded in an efficient market during the Notes Period.[127] Further, some of the indicia consistent with inefficiency, such as low volume and limited analyst coverage, were particularly acute at the end of the Class Period, the very period Dr. Werner is focusing on in his loss causation analysis, with the Note not trading at all in the two weeks prior to the February 7, 2017 disclosure.

89. When asked during deposition, Dr. Werner simply stated that he had not thought about the implications of a lack of market efficiency assumption in his loss causation analysis, and he has not factored the Court's opinion on the market efficiency of the FXCM

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[125] MacKinlay, A. Craig. 1997. "Event Studies in Economics and Finance." *Journal of Economic Literature* 35 (1): 13-39 at 13.

[126] Werner Deposition, 65:16–17 ("A. … can a stock overreact to news or underreact to news? Yeah, it's possible.").

[127] The Notes Period refers to the period between June 24, 2014 and February 6, 2017. *See,* Hendershott Market Efficiency Report, ¶ 7.

Notes into this loss causation and damages analysis.[128] As such, Dr. Werner has no basis to assume that the market for the FXCM Notes is efficient, and hence cannot rely on an event study to reliably assess loss causation for the FXCM Notes.

B. Dr. Werner Makes Numerous Methodological Errors that Render His Event Study Analysis Unreliable

90. In the Hendershott Market Efficiency Report, I made certain methodological criticisms of Dr. Werner's event study model. Dr. Werner has not made any adjustments to his event study to address these criticisms—instead he uses the exact same model he presented at the class certification stage of this case. As such, the same criticisms apply.

91. As described in the Hendershott Market Efficiency Report, Dr. Werner is inconsistent in his choice of the time windows he uses to estimate the expected return for the FXCM Notes. In the estimation period of his event study model, Dr. Werner considered only days on which the FXCM Notes traded for two consecutive trading days, allowing him to calculate a one-day return.[129] However, on the alleged corrective disclosure day, he calculates an 11-day return based on the FXCM Notes price on February 7, 2017 relative to the price on January 26, 2017, the last day prior to February when the FXCM Notes traded.[130]

92. Additionally, Dr. Werner makes a statistical error that causes him to overestimate the statistical significance of the return he attributes to February 7, 2017. Dr. Werner also deviates from accepted practice in academic event studies by including "dummy" variables for each of the days on which FXCM filed an 8-K (as well as for January 16, 2015 through January 23, 2015), for a total of ten dummy variables out of 66 days included in his FXCM Notes event study. The use of these dummy variables would cause Dr. Werner to understate normal FXCM Notes volatility and make it more likely that he would conclude that the

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[128] Werner Deposition, 403:20–404:3 ("Q. And in connection with your analysis for your loss causation and damages report, when you relied on the event study for the FXCM notes, did you assume in your loss causation analysis that the market for FXCM notes was efficient? A. That's not anything I considered or I considered in submitting this report. So I have to think about that."); Werner Deposition 411:17–23 ("Q. Did the Court's ruling on market efficiency for the notes in this matter factor into your loss causation and damages analysis in connection with the notes? A. Did it factor in? I mean I suppose to the extent that I knew about it, it may have factored in but, no, in general, no.").

[129] Werner Market Efficiency Report, ¶ 142.

[130] Hendershott Market Efficiency Report, Appendix C. *See also*, Werner Market Efficiency Report, ¶ 149.

FXCM Notes' return was statistically significant.[131]

93. Finally, in his calculation of residual returns for the FXCM Notes, Dr. Werner uses the same control variables he uses in the stock event study regression model to control for market movements for the FXCM Notes despite the fact that these factors explain returns for the FXCM Notes poorly. Dr. Werner also fails to account for factors typically controlled for in bond event studies such as changes to the level or term structure of interest rates.[132]

IX. Dr. Werner's Constant-Dollar Approach to Estimate Inflation Fails to Reliably Measure Potential Damages Attributed to the Alleged Misrepresentations and Omissions

94. To calculate damages, Dr. Werner purports to apply the "'out-of-pocket' measure of per share damages"[133] in which damages for each investor are equal to "the difference between the actual purchase price of the security and what would have been the purchase price of the security had there been no alleged fraud," which he terms "artificial inflation."[134] I note that my criticisms of Dr. Werner are not related to the concept of the "out-of-pocket" measure per se, but rather his calculation of "artificial inflation" at each point in time.

95. To calculate "artificial inflation," Dr. Werner constructs an "inflation ribbon" which he describes as the "time series indicating how much artificial inflation caused by the alleged fraud was in the security price on each day of the Class Period."[135] Dr. Werner estimates "a dollar-based inflation ribbon"[136] that is "measured using FXCM Securities' residual stock price declines following corrective disclosures."[137] Put plainly, Dr. Werner calculates a residual price decline on February 7, 2017, of $3.39 per share for the FXCM common stock and $16.31 per $100 of par for the FXCM Notes, then applies these same dollar amounts as price inflation to each date during the Class Period.[138]

96. Dr. Werner's damages analysis is flawed and unreliable. First, as mentioned in **Section VII.A**, Dr. Werner has not established that the allegedly corrective information concerning FXCM's relationship with Effex rather than the collateral consequences caused

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[131] Hendershott Market Efficiency Report, ¶ 94.
[132] Hendershott Market Efficiency Report, ¶ 94.
[133] Werner Loss Causation Report, ¶ 85.
[134] Werner Loss Causation Report, ¶ 85–86.
[135] Werner Loss Causation Report, ¶ 86, 88.
[136] Werner Loss Causation Report, ¶¶ 92, 94–96.
[137] Werner Loss Causation Report, ¶ 92.
[138] Werner Loss Causation Report, ¶¶ 90, 92.

the residual price decline on February 7, 2017. If Dr. Werner intends to calculate inflation based on the residual price decline on that date, he must first isolate the portion of the decline, if any, that is attributable to the removal of inflation due to the alleged misrepresentations and omissions, which he has not done.

97. Second, Dr. Werner has not demonstrated that a *constant* dollar amount based on the residual price drop on February 7, 2017, would be a reliable measure of inflation on each date during the Class Period. Dr. Werner asserts that a "constant dollar inflation ribbon is conservative"[139] and clarified in deposition that this approach is "conservative" relative to a "constant percentage" inflation band.[140] Yet Dr. Werner fails to acknowledge that a "constant percentage" approach for calculating damages is inherently unreliable: such an approach may, by design, include in a damages calculation price declines that are not connected to the amount of inflation that was removed due to the alleged corrective disclosures. In particular, if the stock price trends downward during the Class Period, even if the downward movements are unrelated to the allegations, a "constant percentage" method by design would treat part of any such declines as damages, including price declines that occur *prior to* the alleged corrective disclosures. Thus, his conclusion that the constant dollar approach is relatively conservative compared to an invalid approach is not instructive.

98. As explained in the Hendershott Market Efficiency Report, and further below, inflation, if any, is likely to have been time varying. Dr. Werner does not provide any support that would suggest that his constant dollar approach is conservative relative to an alternative approach that accounts for time-varying inflation. As discussed in **Section VI**, from an economic perspective, Dr. Werner has not shown that FXCM should and could have made the same but-for disclosure throughout the Class Period as was made on February 7, 2017 (**Section IX.A**), or that the value implications of a but-for disclosure would be the same throughout the Class Period (**Section IX.B**).

99. Note that I raised similar criticisms regarding the constant dollar back-casting

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[139] Werner Report, Section "Damages A.2".

[140] Werner Deposition, 498:12–18 ("Q. … you're saying that you considered a dollar based and a percentage based and then determined that the dollar base was the more conservative of the two possible options? A. Well, in this example by definition it's the more conservative of the two options…."). *See also,* Werner Deposition, 500:13–19. ("Q. Are you saying there that using constant dollar inflation in this case is more conservative than using some form of time varying inflation that accounts for differences in -- earlier in the class period? A. I don't think that's -- I don't think that's what I'm saying….").

approach in the Hendershott Market Efficiency Report.[141] Despite his claim in the Werner Market Efficiency Rebuttal Report that he would at a later stage "take special care to ensure that an inflation ribbon is constructed such that it properly controls for potential valuation complexities"[142] using a "variety of valuation tools" at his disposal,[143] Dr. Werner has failed to address any of my criticisms.

A. Dr. Werner Has Not Specified What the But-for Disclosure Would Be Throughout the Class Period, Which Is Required to Reliably Measure Inflation

100. As discussed in **Section VI**, estimating an "inflation ribbon" requires considering how the "but-for" disclosure may evolve throughout time. Dr. Werner does not address the possibility,[144] despite acknowledging in deposition that this could be the case.[145]

101. Dr. Werner's use of a constant inflation ribbon effectively assumes that this "but-for" disclosure and its value implications did not change over time. Put another way, Dr. Werner assumes that as of March 15, 2012, the first day of the Class Period, and as of June 24, 2014, the first day of the Notes Period, FXCM could have revealed the same allegedly corrective information disclosed on February 7, 2017, and that this revelation would also have caused the same price reaction observed on February 7, 2017.[146] As discussed earlier, Dr. Werner simply claimed this was what Plaintiffs contended but he has provided no reliable basis for such an assumption.

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[141] Hendershott Market Efficiency Report, ¶¶ 112–115.
[142] Werner Market Efficiency Rebuttal Report, ¶ 82.
[143] Among the "variety of valuation tools" that he asserted he had at his disposal, but which he ultimately did not apply were "valuation multiple models, such as those based on earnings, EBITDA, revenue, book value, and cash flow; discounted cash flow models (DCF); [and] return attribution analysis." *See*, Werner Market Efficiency Rebuttal Report, ¶ 85.
[144] Werner Deposition, 419:7-15 ("Q. Is there any section in your loss causation report where you detail but for disclosures that you believe FXCM should have made during the class period? A. Well, so ultimately it's not up to me to decide what FXCM should have disclosed during the class period. The court will decide what FXCM should have disclosed during the class period and when they should have disclosed it.").
[145] Werner Deposition, 417:20–25 ("Q. Would you agree that in conducting a loss causation analysis and damages analysis, you would need to explore the possibility that the substance of a potential corrective disclosure could change during the class period? A. As a general principle, yes.").
[146] Werner Deposition, 443:2–9 ("Q. What corrective information do you believe could have been disclosed on March 15, 2012? A. Well, I believe that Plaintiffs are contending that whatever information was disclosed on the February 7th, '17 -- 2017 could have been disclosed at the beginning of the class period.").

102. For example, Dr. Werner mentions that the "CFTC investigate[d] FXCM's business relationship with Effex" from October 15, 2014 onwards.[147] As such, any potential disclosure by the company or a third party about potential regulatory outcomes could be different before and after October 15, 2014. Before October 15, 2014, a but-for disclosure could not possibly have disclosed information about an on-going CFTC investigation, while one after October 15, 2014 could. Furthermore, FXCM's "order flow arrangement [with Effex] came to a halt" in August 2014.[148] Therefore, a but-for disclosure before August 2014 about FXCM's payment for order flow arrangement with Effex would therefore necessarily have been different from a disclosure after August 2014.

B. Dr. Werner Has Not Demonstrated that the Value Implications of a But-for Disclosure Would be the Same Throughout the Class Period

103. Even assuming that the but-for disclosure could have remained the same throughout the Class Period, constant dollar inflation would still be inappropriate if the value implications of that disclosure changed over time. As explained below, the value implications of a but-for disclosure in this case are likely to have changed over time, particularly with respect to the FXCM Notes.

104. As a starting point, FXCM's business relationship with Effex evolved during the Class Period and the FX retail market was constantly developing during the Class Period as well. As discussed previously in **Section VII.B**, Dr. Werner has performed no analysis to demonstrate that FXCM's alleged misrepresentations and omissions about its order flow relationship with Effex inflated FXCM's security price, let alone that the inflation remained constant throughout the Class Period.[149]

105. Second, Dr. Werner has not provided any evidence that the market's assessment of the value implications of a but-for disclosure would be the same throughout the Class Period as it related to collateral consequences. For example, if FXCM made a but-for disclosure

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[147] Werner Loss Causation Report, ¶ 36, Sub-Section 3. "October 15, 2014 – February 2017: The CFTC Investigates FXCM's Business Relationship with Effex". Similarly, the Complaint states that "Defendants were on notice of the CFTC investigation by at least October 15, 2014, upon receipt of the CFTC's Request for Production of Documents." *See*, Complaint, ¶ 166.

[148] Opinion on Motion to Dismiss, p. 21.

[149] Similarly, Dr. Werner has not provided any evidence to conclude that FXCM's alleged GAAP violations (*e.g.*, failure to consolidate Effex as a VIE) inflated FXCM's security price, as discussed in Section VII.B.

about its order flow relationship with Effex at the beginning of the Class Period, long before the CFTC investigation even started, the market's expectation for any potential regulatory consequences might have been different (if investors expected any consequences) than at the end of the Class Period.[150] Dr. Werner has not analyzed any factors that could have altered the likely regulatory settlement outcome,[151] or how the market would have factored this type of uncertainty into its assessment of the value implications of a but-for disclosure, and why it is appropriate to assume that this assessment would have remained constant over time.

106. Further, as explained in the Hendershott Market Efficiency Report, FXCM's business changed drastically over the course of the Class Period such that even the same regulatory enforcement outcome could have had different value implications for both the FXCM common stock and FXCM Notes. For example, given that FXCM's business performance within and outside the U.S. changed during the Class Period, the implications of this withdrawal would likely be different at different points in time.[152]

107. Additionally, the likely price reaction of the FXCM Notes to new information would change over time as FXCM's financial condition changed, casting doubt on Dr. Werner's assertion that his choice of constant inflation is "conservative."

108. The price sensitivity to firm-specific information of the FXCM Notes, like that of any corporate bond, depends on the firm's financial strength. When a firm is financially healthy, the likelihood of default is remote, and there is ample "equity cushion" protecting bondholders from defaults, so bondholders can expect to receive pre-specified interest and principal amounts. Therefore, the prices of that firm's bonds will be relatively insensitive to

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[150] I have explained why, from an economic perspective, price reactions to "collateral consequences" may not represent removal of inflation, and that Dr. Werner has not demonstrated that the regulatory action was necessarily expected throughout the Class Period. However, even if Plaintiffs argue that an impact from "collateral consequences" should be included in damages and that what could have been disclosed regarding these consequences did not vary, the price impact of such a disclosure would likely change over time.

[151] As discussed in Section VII.A.2, to the extent that the regulators' weighed the duration of the purported offence or other factors as an important factor in determining the settlement, or FXCM had different business considerations in the negotiation process with the CFTC, the market's expectation of such the regulatory outcome might have been different if the but-for disclosure was made at the beginning of the Class Period. Dr. Werner appears to agree with this idea. *See*, Werner Deposition, 446:7–11. *See also*, Werner Deposition, 447:4–11.

[152] For the year ended December 31, 2013, approximately 87.3% of FXCM's retail customer trading volume was derived from customers residing outside the United States. For the year ended December 31, 2016, approximately 81.8% of FXCM's retail customer trading volume was derived from customers residing outside the U.S. *See*, FXCM 2013 10-K, p. 1. *See also*, FXCM 2016 10-K, p. 1.

firm specific news.[153] This proposition has been established in academic studies, which find that the prices of top-rated bonds are driven primarily by default-free interest rates and are uncorrelated with the issuing firms' stocks (which suggests they are less sensitive to company specific information).[154] Conversely, studies have also found that bonds rated below investment grade are highly correlated with their issuing firms' stocks.[155]

109. Dr. Werner himself stressed the bond prices' potential insensitivity to news, stating that "[b]ecause of bonds' seniority in the capital structure of a company, bonds' values and therefore prices are insulated from all but the most extreme news by a common stock valuation cushion."[156]

110. Over the course of the Class Period, the equity cushion and overall financial situation of FXCM changed dramatically. For example, FXCM's capital and ownership structure changed drastically after the SNB Flash Crash in January 2015 and the resulting loan agreement with Leucadia.[157] On June 24, 2014, when the FXCM Notes started trading, FXCM's equity market capitalization was approximately $645 million and the FXCM Notes were trading at approximately par.[158] At the end of the Class Period on February 6, 2017, FXCM's equity market capitalization was approximately $38 million and the FXCM Notes were trading below $50, substantially below par.[159]

111. As such, Dr. Werner fails to show that the alleged misrepresentations or omissions regarding FXCM's business relationship with Effex could constitute "the most extreme

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[153] In contrast, when a company is financially distressed, creditors are more exposed to potential losses, and the bond will likely trade below par, reflecting the possibility of investors not being repaid in full. In this type of scenario, the price of a bond will be more sensitive to firm specific information, given such information could directly impact likely recovery of bond holders.

[154] Kwan, Simon H. 1996. "Firm-Specific Information and the Correlation Between Individual Stocks and Bonds." *Journal of Financial Economics*, 40: 63–80; Downing, Chris, et al. 2009. "The Relative Informational Efficiency of Stocks and Bonds: An Intraday Analysis," *The Journal of Financial and Quantitative Analysis*, 44 (5): 1081–1102.

[155] Kwan, Simon H. 1996. "Firm-Specific Information and the Correlation Between Individual Stocks and Bonds." *Journal of Financial Economics* 40: 63–80.

[156] Werner Market Efficiency Report, ¶ 137. Werner Deposition, 246:14–19.

[157] The deal with Leucadia included a $300 million senior secured term loan with a 10% coupon, a $10 million deferred financing fee, and "stringent rules about the distribution of proceeds from the sale of assets or the company as a whole, as well as a right for Leucadia to request the sale of the firm at the highest reasonable price after three years." *See*, "Thoughts on Leucadia and the Capital Infusion--Lowering TP and 2015 Estimates," *Credit Suisse*, January 20, 2015, p. 1.

[158] Werner Market Efficiency Report, Exhibit 7.

[159] The last trades before February 6, 2017 were two trades reported in the TRACE data on January 26, 2017, a buy at $47 and a sell at $47.5.

news"[160] and therefore would have caused any price inflation in the FXCM Notes during the earlier portion of the Class Period.

Executed this 10th of June, 2021

Terrence Hendershott, PH.D.

[160] Werner Market Efficiency Report, ¶ 137.

APPENDIX A

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Education

Ph.D., Operations, Information, and Technology, Graduate School of Business, Stanford University, 1999.
B.S., Mathematics and Statistics, Miami University, 1989.

Publications

- Asset Price Dynamics with Limited Attention (with Albert Menkveld, Remy Praz, and Mark Seasholes), forthcoming *Review of Financial Studies*.
- Does Financial Market Structure Impact the Cost of Raising Capital? (with James Brugler and Carole Comerton-Forde), forthcoming *Journal of Financial and Quantitative Analysis*.
- FinTech as a Game Changer: Overview of Research Frontiers (with Michael Zhang, Leon Zhao, and Eric Zheng), *Information Systems Research* 32 (March 2021), 1-17.
- Asset Pricing: A Tale of Night and Day (with Dmitry Livdan and Dominik Rösch), *Journal of Financial Economics* 138 (December 2020), 635-662.
- Relationship Trading in OTC Markets (with Dan Li, Dmitry Livdan, and Norman Schürhoff), *Journal of Finance* 75 (April 2020), 683-734.
- Short Selling and Price Discovery in Corporate Bonds (with Roman Kozhan and Vikas Raman), *Journal of Financial and Quantitative Analysis* 54 (January 2020), 77-115.
- Price Discovery without Trading: Evidence from Limit Orders (with Jonathan Brogaard and Ryan Riordan), *Journal of Finance* 75 (August 2019), 1621-1658.
- High Frequency Trading and the 2008 Short Sale Ban (with Jonathan Brogaard and Ryan Riordan), *Journal of Financial Economics* 124 (April 2017), 22-42.
- Are Institutions Informed about News? (with Dmitry Livdan and Norman Schürhoff) *Journal of Financial Economics* 117 (August 2015), 249-287.
- Click or Call? Auction versus Search in the Over-the-Counter Market (with Ananth Madhavan), *Journal of Finance* 70 (February 2015), 419-447.
- Price Pressures (with Albert Menkveld), *Journal of Financial Economics*, 114 (December 2014), 405-423.
- High-Frequency Trading and Price Discovery (with Jonathan Brogaard and Ryan Riordan), *Review of Financial Studies* 27 (August 2014), 2267-2306. Won Michael J. Brennan Best Paper Award for best paper published in *Review of Financial Studies* in 2015.
- Liquidity provision and stock return predictability (with Mark Seasholes), *Journal of Banking & Finance* 45 (August 2014), 140-151.
- How Slow is the NBBO? A Comparison with Direct Exchange Feeds (with Shengwei Ding and John Hanna), *Financial Review* 49 (May 2014), 313-332.
- High-Frequency Trading and the Execution Costs of Institutional Investors (with Jonathan Brogaard, Stefan Hunt, and Carla Ysusi), *Financial Review* 49 (May 2014), 345-369. Won *Financial Review* Outstanding Publication Award for 2014.
- Levelling the Trading Field (with David Easley and Tarun Ramadorai), *Journal of Financial Markets* 17 (January 2014), 65-93.
- The Intended and Collateral Effects of Short-Sale Bans as a Regulatory Tool (with Ethan Namvar and Blake Phillips), *Journal of Investment Management* 11 (2013), 5-13.
- Algorithmic Trading and the Market for Liquidity (with Ryan Riordan), *Journal of Financial and Quantitative Analysis* 48 (August 2013), 1001-1024. Won 2013 Philip Brown Prize.
- Informed Trading and Portfolio Returns (with Alex Boulatov and Dmitry Livdan), *Review of Economic Studies* 80 (January 2013), 35-72.

- Automation, Speed, and Stock Market Quality: The NYSE's Hybrid (with Pam Moulton), *Journal of Financial Markets* 14 (November 2011), 568-604.
- Does Algorithmic Trading Increase Liquidity? (with Charles Jones and Albert Menkveld), *Journal of Finance* 66 (February 2011), 1-33. Won New York Stock Exchange Euronext Award for best paper on equity trading, Western Finance Association (2008). Finalist for the Smith-Breeden Prize for best paper published in the *Journal of Finance*.
- Time Variation in Liquidity: The Role of Market Maker Inventories and Revenues (with Carole Comerton-Forde, Charles Jones, Pam Moulton, and Mark Seasholes), *Journal of Finance* 65 (February 2010), 295-331.Won Nasdaq Award for best paper on market microstructure, Financial Management Association (2007).
- The NFL Should Auction Possession in Overtime Games (with Yeon-Koo Che), *Economists' Voice* 9 (October 2009), http://www.bepress.com/ev/vol6/iss9/art5/.
- A Comparison of Trading and Non-Trading Mechanisms for Price Discovery (with Michael Barclay), *Journal of Empirical Finance* 15 (December 2008), 839-849.
- How to Divide the Possession of a Football? (with Yeon-Koo Che), *Economics Letters* 99 (June 2008), 561-565.
- Order Consolidation, Price Efficiency, and Extreme Liquidity Shocks (with Michael Barclay and Charles Jones), *Journal of Financial and Quantitative Analysis* 43 (March 2008), 93-121.
- Market Maker Inventories and Stock Prices (with Mark Seasholes), *American Economic Review (P&P)* 97 (May 2007), 210-214.
- Automation versus Intermediation: Evidence from Treasuries Going Off the Run (with Michael Barclay and Kenneth Kotz), *Journal of Finance* 61 (October 2006), 2395-2414.
- A Model of Direct and Intermediated Sales (with Jie Zhang), *Journal of Economics & Management Strategy* 15 (Summer 2006), 279-316.
- Island Goes Dark: Transparency, Fragmentation, and Regulation (with Charles Jones), *Review of Financial Studies* 18 (Fall 2005), 743-793.
- Trade-through Prohibitions and Market Quality (with Charles Jones), *Journal of Financial Markets* 8 (February 2005), 1-23.
- Liquidity Externalities and Adverse Selection: Evidence from Trading After Hours (with Michael Barclay), *Journal of Finance* 59 (April 2004), 681-710.
- Competition Among Trading Venues: Information and Trading on Electronic Communications Networks (with Michael Barclay and Tim McCormick), *Journal of Finance* 58 (December 2003), 2637-2666. Won New York Stock Exchange Award for best paper on equity trading, Western Finance Association (2001). Nominated for the Smith-Breeden Prize for best paper published in the *Journal of Finance.*
- Price Discovery and Trading After Hours (with Michael Barclay), *Review of Financial Studies* 16 (Winter 2003), 1041-1073.
- Electronic Trading Systems in Financial Markets, *IEEE-IT Professional* 5 (Jul/Aug 2003), 10-14.
- The Future of Virtual Malls (with Patric Hendershott and Robert Hendershott), *Real Estate Finance* 18 (Spring 2001), 25-32.
- Crossing Networks and Dealer Markets: Competition and Performance (with Haim Mendelson), *Journal of Finance* 55 (October 2000), 2071-2115. Nominated for the Smith-Breeden Prize for best paper published in the *Journal of Finance*.
- Bundling and Optimal Auctions of Multiple Products (with Christopher Avery), *Review of Economic Studies* 67 (July 2000), 483-497.
- Will the Internet Reduce the Demand for Mall Space? (with Patric Hendershott and Robert Hendershott), *Real Estate Finance* 17 (Spring 2000), 41-46.

Working Papers

- True Cost of Immediacy (with Dmitry Livdan, Dan Li, and Norman Schürhoff)
- Stock Exchanges as Platforms for Data and Trading (with Marc Rysman and Rainer Schwabe)
- Order Exposure in High Frequency Markets (with Bidisha Chakrabarty, Samarpan Nawn, and Roberto Pascual)

- Transparency in Fragmented Markets: Experimental Evidence (with Marvin Wee and Yuanji Wen)
- Market Predictability and Non-Informational Trading (with Mark Seasholes).

Books, Reviews, and Chapters

- Handbook of Economics and Information Systems (Editor), Elsevier, ISBN 0444517715.
- Implementation Shortfall with Transitory Price Effects (with Charles Jones and Albert Menkveld), chapter in High Frequency Trading: A Survival Guide, Eds. David Easley, Marcos Lopez de Prado, and Maureen O'Hara, Risk Books.
- Book Review of Econometrics of Financial High-Frequency Data, by Nikolaus Hautsch, *Quantitative Finance* (2013).

Other Publications

- Call for Papers—Special Issue of Information Systems Research Fintech – Innovating the Financial Industry Through Emerging Information Technologies (with Michael Zhang, Leon Zhao, and Eric Zheng), *Information Systems Research* (December 2017), 885-886.
- Automated Trading, *Encyclopedia of Quantitative Finance*.
- Preface to the Focus Theme Section: 'Financial Market Engineering' (with Dirk Neumann, Robert Schwartz, Bruce Weber, and Christof Weinhardt), *Electronic Markets* 16 (May 2006), 98-100.
- An Economic View of Information Systems (with Krishnan Anand), Introduction to Special Issue on Information Systems and Economics, *Decision Support Systems* 41(May 2006), 683-687.
- Wall St's appeal for new rules is not altruistic, *Financial Times*, comment/op-ed, 7/21/2004, p. 13.
- Should the Outcome of a Coin Flip Mean So Much in NFL Overtime? Bid for the Ball (with Jonathan Berk), *Wall Street Journal Online*, 12/22/2003.

Honors, Awards, Miscellaneous

- Faculty Director, Master of Financial Engineering, UC Berkeley (2020-)
- University of California Retirement System Advisory Board (2020-)
- Willis H. Booth Chair in Banking and Finance, Haas School of Business, UC Berkeley (2017-)
- Norwegian Finance Initiative Grant to study the effect of technological and regulatory changes on market structure and transparency across equity and fixed-income markets in the US and Europe (2018-2021)
- Digging into Data Round 4; Digging Into High Frequency Data: Present And Future Risks And Opportunities (2016-2020)
- Market Surveillance Advisory Group, Financial Industry Regulatory Authority(2016-2018)
- Cheryl and Christian Valentine Chair, Haas School of Business, UC Berkeley (2012-2017)
- Consultant, Office of the Chief Economist, Commodity Futures Trading Commission (2016-2017)
- Distinguished Visiting Scholar, Securities and Exchange Commission (2015).
- Michael J. Brennan Best Paper Award for best paper published in *Review of Financial Studies* in 2014.
- *Financial Review* Outstanding Publication Award for 2014.
- 2013 Philip Brown Prize.
- High Frequency Trading Subcommittee of the Technology Advisory Committee, Commodity Futures Trading Commission (2012-2013)
- Barbara and Gerson Bakar Faculty Fellow, Haas School of Business, UC Berkeley (2011-2012)
- Consultant, Office of the Chief Economist, Commodity Futures Trading Commission (2009-2011)
- Visiting Scholar, University of Sydney (2010)
- Net Institute Grant (2009)
- Kauffman Foundation Entrepreneurship & Innovation Research Grant (2008-2009)
- New York Stock Exchange Euronext Award for best paper on equity trading, Western Finance Association (2008)
- Visiting Fellow, The Paul Woolley Centre for the Study of Capital Market Dysfunctionality, London School of Economics (2008)
- Nasdaq Award for best paper on market microstructure, Financial Management Association (2007)
- Visiting Professor, Université Paris-Dauphine (2007, 2008, 2009, 2010, 2012, 2013)
- Nasdaq Economic Advisory Board, (2004-7; Chair 2007)

- Visiting Economist, New York Stock Exchange (2005-2006)
- National Science Foundation Grant #0133848, CAREER: Electronic Trading Systems (2002-2006)
- Schwabacher Fellow (outstanding teaching and research), University of California, Berkeley (2005-2006)
- Junior Faculty Research Grant, Committee on Research, University of California, Berkeley (2001, 2003)
- New York Stock Exchange Award for best paper on equity trading, Western Finance Association (2001)
- Simon School Teaching Honor Roll, University of Rochester (2000, 2001)
- Xerox Assistant Professor, University of Rochester (1999-2001)
- Frye Fellowship, Stanford University (1992)
- Chiles Fellowship, Stanford University (1991)

Teaching Experience

- High-Frequency Finance (MFE 230X), UC Berkeley.
- Introduction to Business Analytics (UGBA 104), UC, Berkeley.
- Information Technology Strategy (MBA 247B, ENGIN 298A, INFOSYS 290, UGBA 196), UC, Berkeley.
- Operations Management (MBA and EWMBA 204), UC, Berkeley.
- Financial Information Systems (CIS 446/Finance 446), University of Rochester.
- Investment Management and Trading Strategies (Finance 434), Simon School, University of Rochester.

Professional Service

Editorial:

- Associate Editor, *Journal of Financial Markets*, 2012-
- Associate Editor, *Management Science*, 2010- 2018
- Associate Editor, *Journal of Banking & Finance*, 2015-2016
- Co-Editor, *Journal of Economics and Management Strategy*, 2006-2013
- Associate Editor, *Information Systems Research*, 2004-5
- Associate Editor, *Decision Support Systems*, 2003-2016
- Advisory Editor, *Handbooks in Information Systems*, Elsevier
- Guest Editor, Special Issue on Behavioral Finance and Recent Developments in Capital Markets, *Pacific-Basin Finance Journal*
- Guest Editor, Focus Theme Section: 'Financial Market Engineering', *Electronic Markets*
- Guest Editor, Special Issue on Information Systems and Economics, *Decision Support Systems*

Conferences:

- Western Finance Association, program committee, 2011-
- SAFE Market Microstructure Conference, program committee, 2017-
- Napa Conference on Financial Markets, program committee, 2009-2017
- European Finance Association, program committee, 2001-2004, 2012-2016
- French Finance Association Paris December Conference, 2013-
- Finance Down Under Conference, 2013-2016
- Society for Financial Econometrics and Tinbergen University (Amsterdam) Conference on Measuring and Understanding Asset Price Changes: The Price of Liquidity, and the Liquidity of Price, program committee, 2011
- NYSE-Euronext/Dauphine University, 3rd Workshop on Financial Market Quality, organizer, 2010
- NYSE Euronext & Tinbergen Institute Workshop on Liquidity and Volatility, program committee, 2009
- National Institute of Securities Markets Conference on Structure, Microstructure and Regulation of Securities Markets, Mumbai, India, program committee, 2008
- NYSE-Euronext/Dauphine University, 2nd Workshop on Financial Market Quality, organizer, 2008
- INFORMS Conference on Information Systems and Technology, program committee, 2000-6
- Microstructure of International Financial Markets, Hyderabad, India, program committee, 2006
- FinanceCom (International Workshop on Finance Industry Enterprise, Applications & Services), program committee, 2005-2012

APPENDIX A

Prior Testimony

(Past four years)

Deposition Testimony (2017), *In re Allergan, Inc. Proxy Violation Securities Litigation*, Case No. 8:14-cv-2004-DOC (U.S. District Court Central District of California, Southern Division).

Deposition and Trial Testimony (2017, 2018, 2019), *SEC v. Lek Securities Corp, et al.*, Case No. 17-cv-1789 (U.S. District Court Southern District of New York).

Deposition Testimony (2018), *Axiom Investment Advisors, LLC et al., v. Deutsche Bank AG*, Case No. 1:15-cv-09945 (U.S. District Court Southern District of New York).

Deposition Testimony (2018), *In re The Bank of New York Mellon ADR FX Litigation*, Case No. 16-cv-00212 (U.S. District Court Southern District of New York).

Deposition Testimony (2018), *Carver, et al., v. The Bank of New York Mellon, et al.*, Case No. 15-cv-10180 (U.S. District Court Southern District of New York).

Deposition Testimony (2018, 2019), Covered business method reviews, Patent numbers 6,618,707, 7,246,093, 7,599,875, 7,921,051, 8,386,371, Patent and Trademark Office.

Deposition and Evidentiary Hearing Testimony (2020), *In re Global Brokerage, Inc f/k/a FXCM Inc. Securities Litigation*, Case No. 1:17-cv-00916-RA-BCM (U.S. District Court Southern District of New York).

Deposition and Trial Testimony (2019, 2020), *Emily and Malcom Fairbairn v. Fidelity Investments Charitable Gift Fund*, Case No. 3:18-cv-04881 (U.S. District Court Northern District of California).

APPENDIX B

Documents Considered List

Document Title	Document Date
Legal Pleadings and Motions	
Memorandum of Law in Support of Amended Motion for Class Certification and Appointment of Class Representatives and Class Counsel, *In re Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*	April 9, 2020
Opinion & Order Class Action, *In re Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*	March 28, 2019
Order Adopting Report & Recommendation, *In Re Global Brokerage Inc., f/k/a FXCM Inc. Securities Litigation*	March 23, 2021
Order Instituting Proceedings Pursuant to Sections 6(c) and 6(d) of the Commodity Exchange Act, Making Findings, and Imposing Remedial Sanctions, *In the Matter of Forex Capital Markets, LLC, FXCM Holdings, LLC, Dror Niv, and William Ahdout*	February 6, 2017
Plaintiffs' Third Amended Consolidated Securities Class Action Complaint, *In re Global Brokerage, Inc. f/k/a FXCM Inc. Securities Litigation*	April 17, 2020
Report and Recommendation to the Honorable Ronnie Abrams, *In Re Global Brokerage Inc., f/k/a FXCM Inc. Securities Litigation*	March 18, 2021
Expert Reports	
Expert Report of John E. Barron, CPA	April 21, 2021
Expert Report of Dr. Adam Werner and supporting materials	April 21, 2021
Expert Report of Simon Wilson-Taylor	April 21, 2021
Corrected Expert Report of Dr. Adam Werner and supporting materials	January 10, 2020
Expert Report of Dr. Adam Werner and supporting materials	July 27, 2020
Depositions	
Deposition of Adam Werner, Ph.D.	February 28, 2020 and June 4, 2021
Deposition of Drew Niv, In re: Global Brokerage, Inc. F/k/a FXCM, Inc. Securities Litigation, with exhibits	February 11, 2021
Deposition of John Dittami, In re: Global Brokerage, Inc. F/k/a FXCM, Inc. Securities Litigation, with exhibits	January 21, 2021
Deposition of Drew Niv, Commodity Futures Trading Commission, In the Matter of: Retail Forex Fraud, with exhibits	May 25, 2016
Deposition of John Dittami, Commodity Futures Trading Commission, In the Matter of: Retail Forex Fraud, with exhibits	April 7–8, 2016
SEC Filings	
FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2010	March 31, 2011
FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2011	March 15, 2012
FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2012	March 18, 2013
FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2013	March 17, 2014
FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2014	March 16, 2015
FXCM Inc., Form 10-K for Fiscal Year Ended December 31, 2015	March 11, 2016

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Document Title	Document Date
FXCM Inc., Form 10-Q for Quarterly Period Ended September 30, 2014	November 7, 2014
FXCM Inc., Form 8-K and associated exhibits	February 7, 2017
Global Brokerage Inc., Form 10-K for Fiscal Year Ended December 31, 2016	March 20, 2017
Analyst Reports	
"4Q14 Results and Business Update; Lowering TP," *Credit Suisse*	March 13, 2015
"Focused on the Opportunity Set Available," *Barclays*	March 13, 2015
"FXCM Settles with Regulators, Plans to Exit U.S. Business," *Cowen and Company*	February 7, 2017
"Going Principal (At Least Partially)," *UBS*	August 9, 2012
"Growing Institutional Offering Through Acquisition," *Barclays*	June 14, 2012
"Leucadia National Corporation: FXCM Negative Developments But Likely a Relatively Small Financial Impact on LUK," *Oppenheimer*	February 7, 2017
"Lucid, A 'Clearly' Attractive Deal," *Credit Suisse*	June 14, 2012
"Strengthening Institutional Business in Highly Accretive Fashion," *UBS*	June 14, 2012
"Thoughts on Leucadia and the Capital Infusion--Lowering TP and 2015 Estimates," *Credit Suisse*	January 20, 2015
Academic Text	
Dedman, Elisabeth and Clive Lennox. "Perceived Competition, Profitability and the Withholding of Information About Sales and the Cost of Sales." *Journal of Accounting & Economics* 48: 210–230	2009
Downing, Chris, et al. "The Relative Informational Efficiency of Stocks and Bonds: An Intraday Analysis." *Journal of Financial and Quantitative Analysis*, 44 (5): 1081–1102	2009
Ellis, Jesse A., et al. "Proprietary Costs and the Disclosure of Information About Customers." *Journal of Accounting Research* 50 (3): 685–728	2012
Fama, Eugene F. "Efficient Capital Markets: A Review of Theory and Empirical Work." *The Journal of Finance* 25 (2): 383–417	1970
Healy, Paul M., and Krishna G. Palepu. "Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature." *Journal of Accounting & Economics* 31, 2001: 405–40	2001
Kwan, Simon H. "Firm-Specific Information and the Correlation Between Individual Stocks and Bonds." *Journal of Financial Economics* 40: 63–80	1996
MacKinlay, A. Craig. "Event Studies in Economics and Finance." *Journal of Economic Literature* 35 (1): 13–39	March 1997
Ross, Stephen A., et al. *Corporate Finance*. 6th Edition. McGraw-Hill Irwin	2003
Publicly Available Materials	
FXCM Website, https://www.fxcm.com/markets/about-fxcm/global-broker/, accessed June 9, 2021	June 9, 2021
"FX Broker FXCM Gets Rescue from Jefferies Parent Leucadia," *Reuters*, https://www.reuters.com/article/us-swiss-snb-fxcm/fx-broker-fxcm-gets-rescue-from-jefferies-parent-leucadia-idUSKBN0KP1MY20150117, accessed May 27, 2021	January 16, 2015
"Global Brokerage, Inc. OTCPK:GLBR FQ3 2014 Earnings Call Transcripts," *S&P Global Market Intelligence*	November 6, 2014

APPENDIX B

Document Title	Document Date
Other Produced Documents	
FXCM Memorandum, "Analysis of Benefit to FXCM Clients," GLBR_00041750–2	February 13, 2015
FXCM Presentation, "Research Analyst Presentation," GLBR_00103494–552	August 17, 2010

Note: In addition to the documents on this list, I considered all documents cited in my report to form my opinions.